

A revision of *Sphenodesme* (Verbenaceae)

by

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INTRODUCTION

The genus *Sphenodesme* was established by Jack in 1820 with one species, *S. pentandra*, the type specimen of which was collected by him in Penang and now preserved in the Herbarium at Edinburgh. Apparently Wallich, with whom Jack corresponded (Burkill in Journ. Roy. Asiat. Soc. Str. Br. 73, 1916, pp. 184 & 261), determined Jack's plant to be identical with the Sylhet species cultivated in the Botanic Gardens, Calcutta, and listed by Roxburgh without any description as *Roscoea pentandra* in his Cat. Hort. Bengalensis (1814) 64. In his protolog Jack referred to Roxburgh's invalid binomial but since that generic name was preoccupied, he adopted a new one.

Under the present Nomenclatural Code, Jack was quite right in giving this genus a new name as Roxburgh's binomial is not valid and therefore cannot claim priority. Hence the holotype of *Sphenodesme pentandra* Jack is Jack's specimen collected from Penang.

However, a good deal of confusion exists on the use of the name of *Sphenodesme pentandra*, because early botanists, following the old, now outdated, practice, gave priority to manuscript names attached to the plants cultivated in Gardens or to the specimens preserved in or distributed to, one herbarium or more. Under the present Code such names are discarded as *nomina invalida* or *nuda*. In this category will come the binomial *Roscoea pentandra* Roxb. or *Congea pentandra* Wall., adopted without any valid description for plants before the publication of Jack's monotypic genus. Hence Jack's species must be regarded, not as *Sphenodesme pentandra* (Roxb.) Jack, as many modern botanists have done, but merely as *Sphenodesme pentandra* Jack.

The earliest valid publication of *Roscoea pentandra* was in Roxburgh's *Flora Indica* III (1832) 54, which is antedated by Jack's publication by twelve years. Similarly, *Congea jackiana* Wall (1828 & 1830) which Schauer combined to *S. jackiana* (Wall.) Schauer is a superfluous name for Jack's species. *Roscoea pentandra* Roxb. with its isonym *S. pentandra* (Roxb.) Griff. is synonymous with *S. wallichiana* Schauer which is reduced here as a variety of *S. pentandra* Jack.

* Colombo Plan Fellow, Botanic Gardens, Singapore, 1965.

Affinities

The genus was originally placed in the tribe Viticeae of Verbenaceae with a note that, "the genus is distinct from *Congea* of Roxburgh by the leaves of the involucre being all distinct; the nearly regular corolla, and the five nearly equal stamina" (Jack in Malay Misc. I, 1820, p. 19). Meissner (*Plantarum Vascularum Genera* Vol. I, 1836, p. 292 & II, *Commentarius* 1843, p. 200) who, like Wallich, considered the genus *Sphenodesme* synonymous with *Congea*, transferred it to his new tribe *Symphoremeeae*, with *Symphorema* as the type. Schauer (1847) accepted *Symphoremeeae* as a sub-tribe of *Viticeae* and kept *Sphenodesme* as a distinct genus. Benthams & Hooker (*Gen. Plant.* II, 1876 p. 1159) reinstated *Symphoremeeae* as a tribe and also retained the genus *Sphenodesme*. as a sub-tribe of *Viticeae* and kept *Sphenodesme* as a distinct genus. Benthams & Hooker (*Gen. Plant.* II, 1876 p. 1159) reinstated *Symphoremeeae* as a tribe and also retained the genus *Sphenodesme*. In this they were generally followed by subsequent revisers. However, Briquet in *Engl. & Prantl, Pflanzenf.* IV 3a (1897) 179, raised the status of *Symphoremeeae* to a sub-family SYMPHOREMOIDEAE. Moldenke in 1959 raised this again to a status of family "SYMPHOREMACEAE". In the present revision, however, I have not been able to make any evaluation of these views.

The genus is closely allied morphologically to *Congea* and *Symphorema* with which it has often been confused in the past. However, it can be easily distinguished from the other two by its involucre bracts being always 6, and stamens 5 rarely 6. In *Congea* the involucre bracts are 3-4 and the stamens 4 only, while in *Symphorema* the involucre bracts are 6, and stamens 6-18.

Inflorescence

The inflorescence is a terminal or lateral panicle consisting of decussate cymes. The cyme is generally twice dichotomous, with a single flower at each fork (see **fig. 1**). In a fully developed cyme, there is a flower at each of the fork and at the end of each of the four secondary lateral branches, so that such a cyme is 7-flowered as in *S. pentandra* and *S. triflora* var. *montana*. The flower in the primary fork is not bracteate, but other flowers are axillary to bracts. Hence the involucre bracts are in two groups of 3+ 3. In *S. triflora* and *S. mekongensis*, the flowers on the secondary lateral branches do not develop, and so produce 3-flowered cymes. In *S. triflora* var. *riparia* and *S. sarawakensis*, one flower on each of the secondary branches are suppressed to make the cymes 5-flowered. Some botanists have described 4 or 6 flowered cymes, a number that seems unusual in this genus, and may have occurred due to an abnormal suppression or development of flowers. In the numerous specimens examined by me I have not found a single cyme that had an even number of flowers.

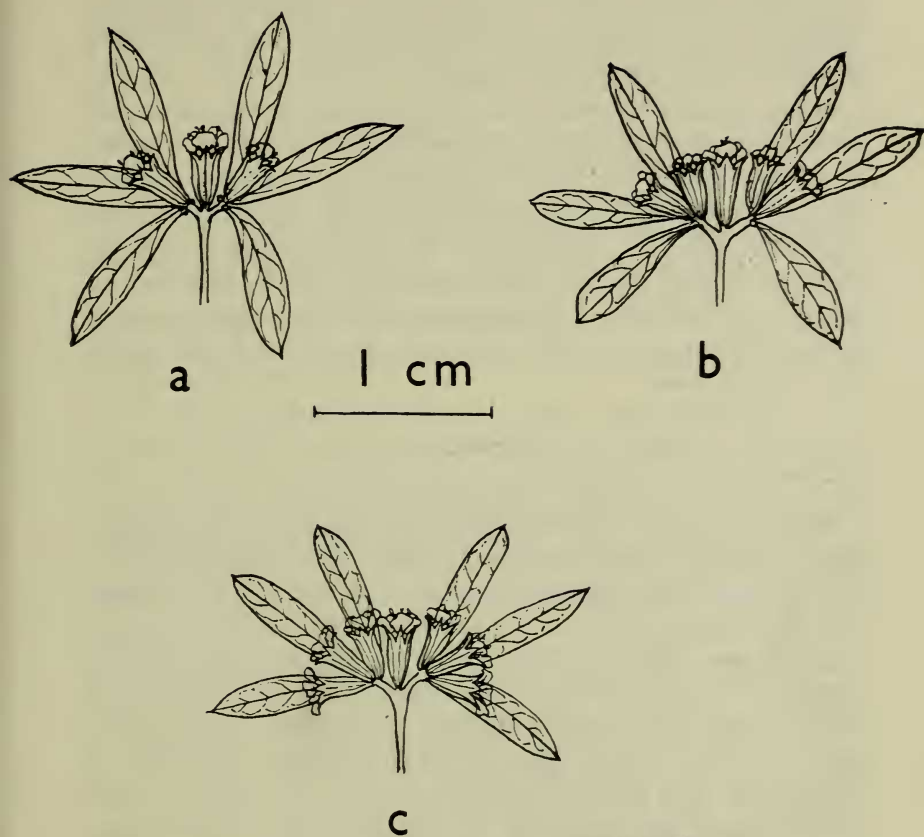


Fig. 1. Different types of cymes in the genus *Sphenodesme*.

- (a) 3-flowered cyme, showing suppressed flowers on the secondary lateral branches.
- (b) 5-flowered cyme, showing suppression of one flower on each of the secondary branches.
- (c) 7-flowered cyme.

Calyx and Epicalyx

The calyx in the genus is either 5-ribbed or 10-ribbed. It is five ribbed where it has five lobes, and ten ribbed where it has in addition 5 accessory teeth. Some authors like Clarke (Fl. Br. Ind. IV, 1885 p. 602) considered these teeth as post-anthesial development and so regarded *S. pentandra* and its var. *wallichiana* as exact synonyms; but these teeth are noticed even in the early stages of the flower. In fact the accessory teeth represent congenitally fused epicalyx, so that technically they may be called episepals.

In the section BRACHYNEMA the calyx is five ribbed and has no accessory teeth. The calyx in the section SPHENODESME is either five or ten ribbed, the latter accompanied, as said above, with 5 accessory-teeth. The accessory-teeth generally alternate with the calyx-lobes, but in *S. racemosa* and its variety *sabahensis* they are opposite. Among the ten ribbed species the calyx-lobes may be entire as in *S. pierreii*, *S. mekongensis* and *S. pentandra*, or they may be bifid at apex as in *S. racemosa*, *S. sarawakensis*, *S. mollis* and *S. griffithiana*.

Sections

Briquet retained the section BRACHYNEMA (Griff.) Clarke for the species having included stamens and style, the former seated on short filaments and the latter provided with a minute style. However, following Clarke, he retained *S. eryciboides* in the section SPHENODESME proper, but created for it a new sub-section ERYCIBODEAE on the basis of the length of involucral bracts, for this is the only species in the genus that has its involucral bracts shorter than the calyx. If this character were of special importance it should have been used as a sectional basis in the genus, or sub-sectional basis under the section BRACHYNEMA. But, it seems certain that neither Clarke nor Briquet had examined the inner structure of the flower of this species; nor even Moldenke (1959) who retained the sectional sub-divisions made by Briquet. Both the stamens and the style in *S. eryciboides* are not exsert as in the species of section BRACHYNEMA, the only difference being that its stamens with short filaments are seated at the corolla throat and not deep in the tube. Hence I have transferred sub-section ERYCIBODEAE to become a sub-section of BRACHYNEMA.

However, there are good reasons to sub-divide section SPHENODESME into two sub-sections on the presence of accessory teeth (Epicalyx) — SPHENODESME sensu stricto (= Decadontia Griff.), or their absence, PENTADONTIA.

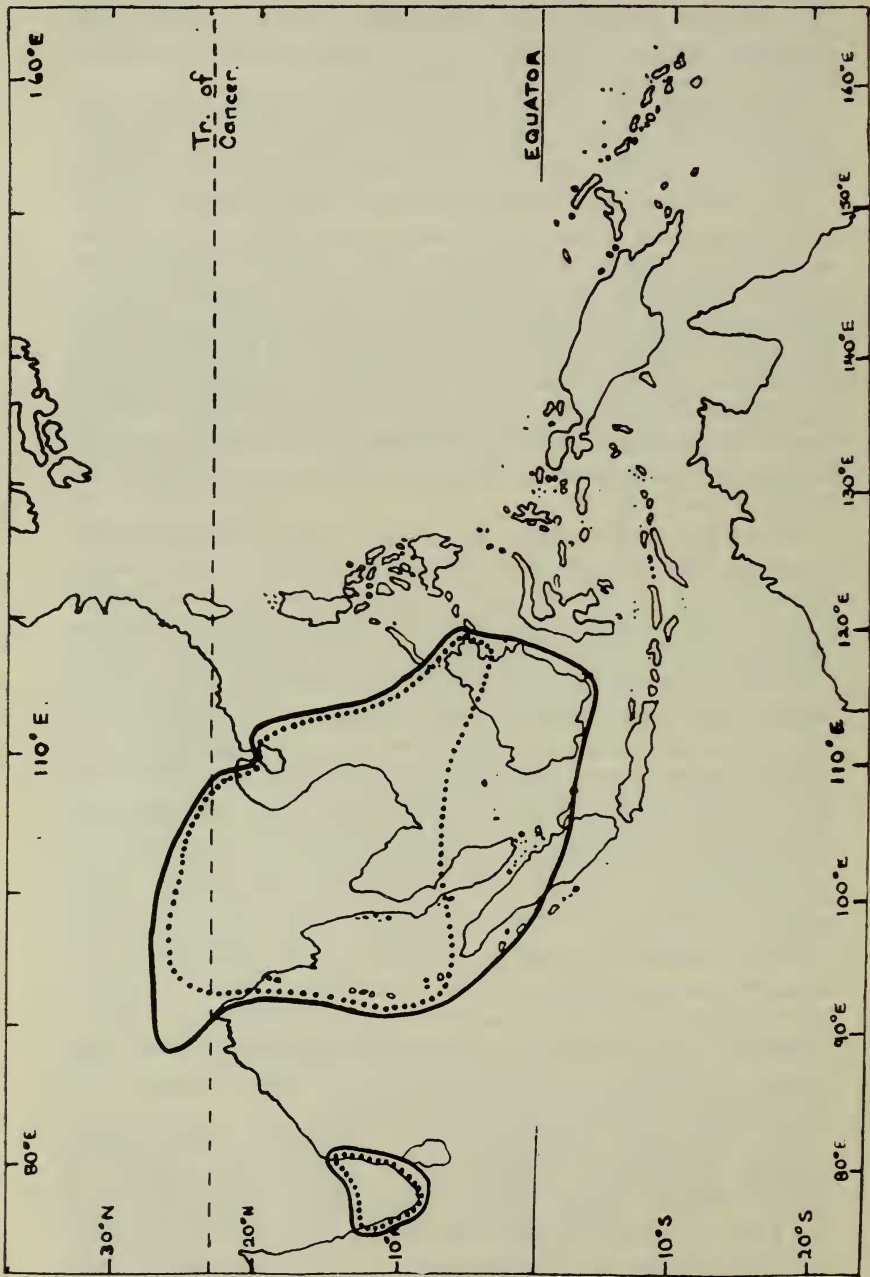
Distribution

The genus in its distribution is restricted in the tropics of Asia, lying between 0–25° north latitude and 75–120° east longitude. This includes southern and north-eastern parts of India, East Pakistan, Burma, Thailand, Laos, Vietnam, South East China, Malaya, Sumatra and Borneo (See Map 1).

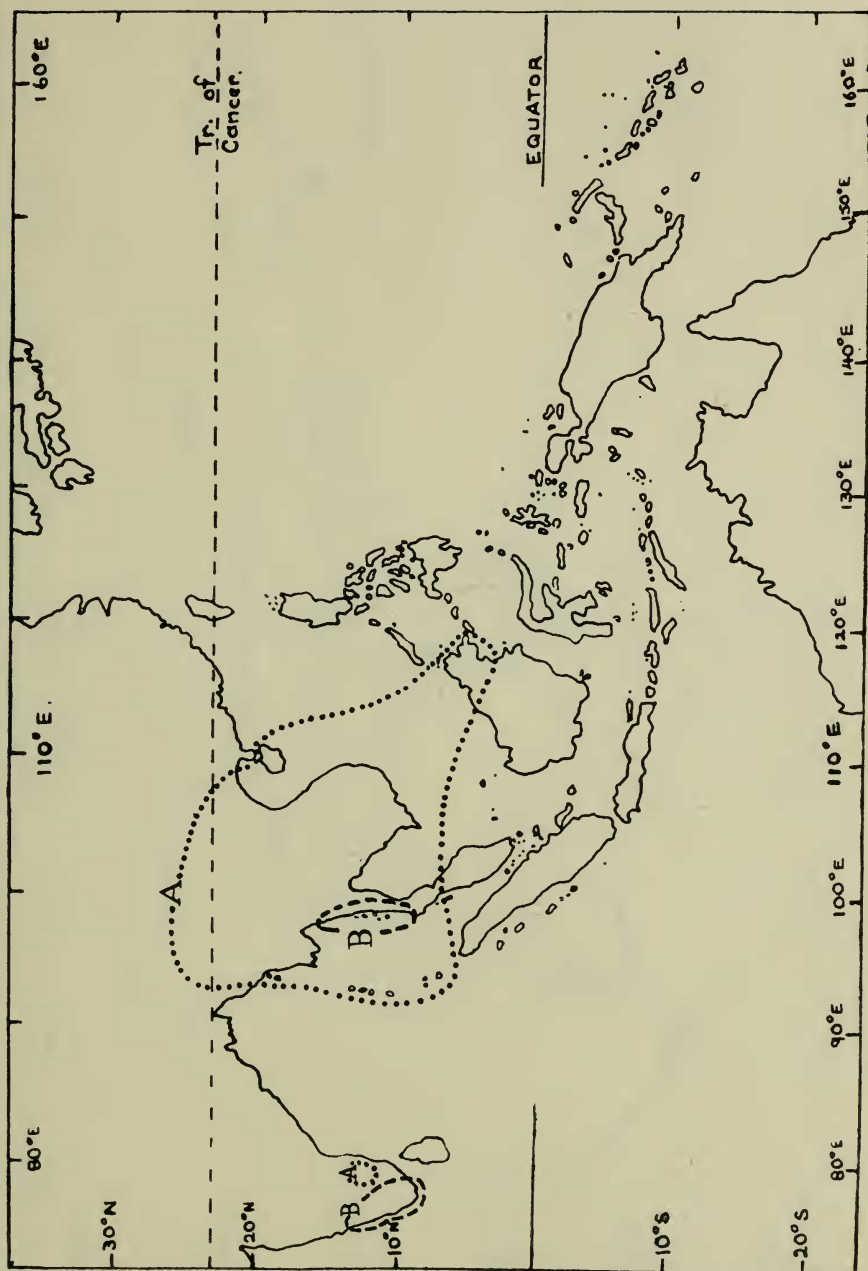
The members of the section BRACHYNEMA are recorded from South and North-East India, Burma, Thailand, Laos, Vietnam, Hainan and Borneo, but so far not from Malaya and Sumatra. *S. involucrata* var. *involucrata* is the most widely distributed species of the section, the only one that occurs also in regions like eastern parts of South India, North-Eastern India (Manipur), Hainan and Borneo. Further, its variety *paniculata* occurs in western parts of South India where no other member of the genus has been found and also in Tenasserim in Burma, this last record being apparently exceptional (see Map 1 & 2). *S. ferruginea* is common in Burma and Thailand, and to a less extent found also in Laos and Vietnam. *S. eryciboides* of the monotypic subsection ERYCIBOIDEAE is found in Bassein and Tenasserim in Lower Burma and at Kanburi in Thailand (see Map 3).

The section SPHENODESME has a much wider distribution than the section BRACHYNEMA, being found also in Malaya and Sumatra. The members of the sub-section SPHENODESME are found in N. Eastern India, Nicobars, East Pakistan, Burma, Thailand, Malaya, Sumatra, Borneo, Laos, Vietnam and S. East China (see Map 4). Of these species, *S. racemosa* is restricted to Malaya, Sumatra and Borneo, while its variety *sabahensis* is endemic in Sabah (Borneo). The two varieties of *S. pentandra* together occur in all the countries included in the generic distribution except S. India and Sumatra; but *S. pentandra* var. *pentandra* is represented in the southern parts of the region, (especially in Thailand, Malaya and Borneo) while *S. pentandra* var. *wallichiana* is its northern representative (being found especially in N. East India (Assam), East Pakistan, Upper Burma and Hainan), but these varietal forms meet in Malaya, Laos and Vietnam (see Map. 4). Similarly, *S. sarawakensis* and *S. pierrei* are respectively endemic in Sarawak and S. Vietnam (Cochinchine). The other three species of the sub-section SPHENODESME are non Malesian. *S. mekongensis* occurs in Thailand and Laos, *S. griffithiana* in Lower Burma and Vietnam and *S. mollis* in Thailand, Vietnam and Yunnan (China).

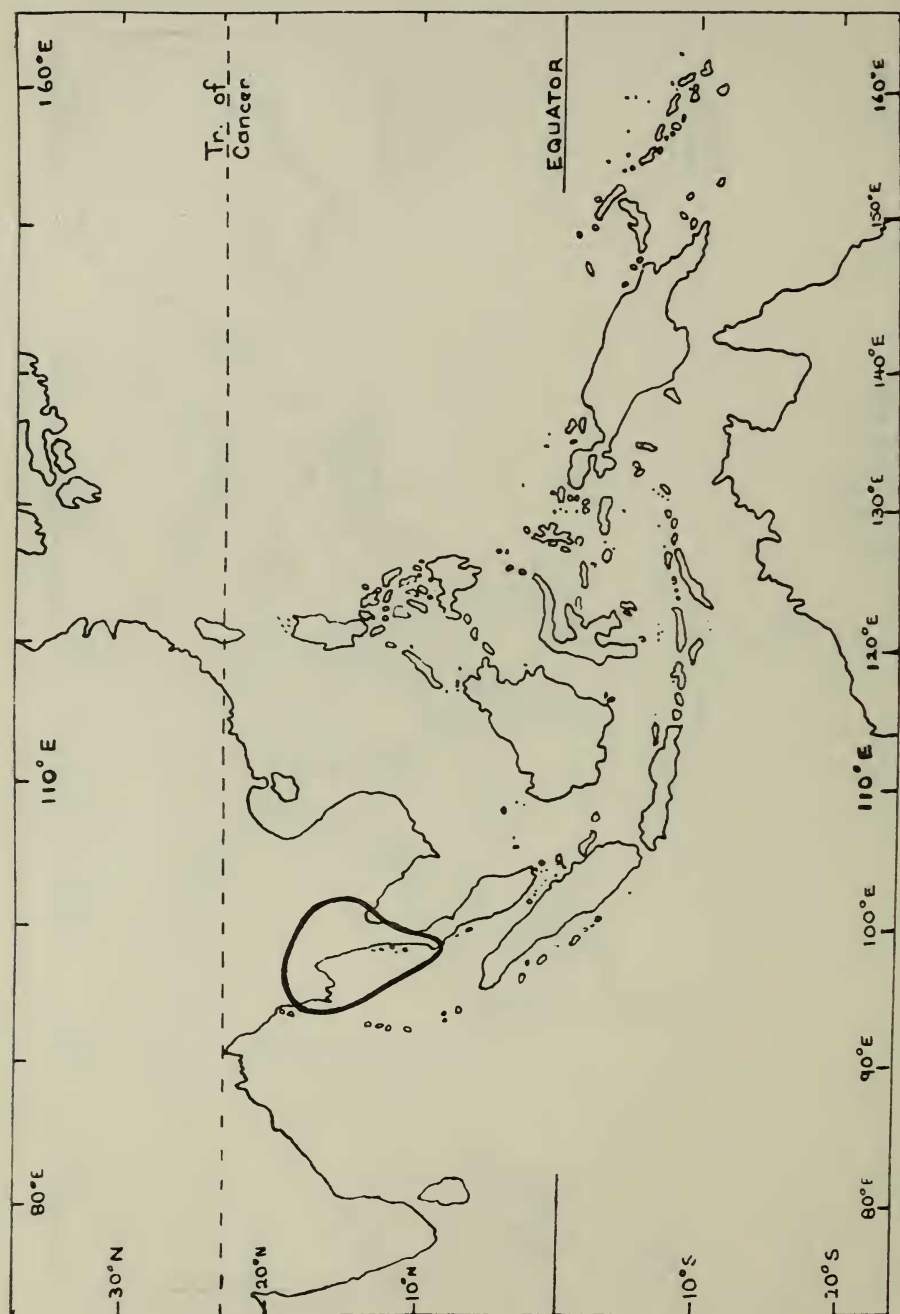
The sub-section PENTADONTIA is represented from Malaya, Sumatra, Borneo and Vietnam. But *S. triflora* sensu stricto is a purely Malesian species, being found in Malaya, Sumatra, Borneo and Lower Thailand (Betong) (see Map 5). The other two varieties of *S. triflora*, that is, var. *riparia* and var. *montana*, are endemic in Sabah (Borneo). Of the three remaining species of this sub-section, *S. thorelii* and *S. amethystina* are endemic in Vietnam, and *S. stellata* in Sabah (Borneo).



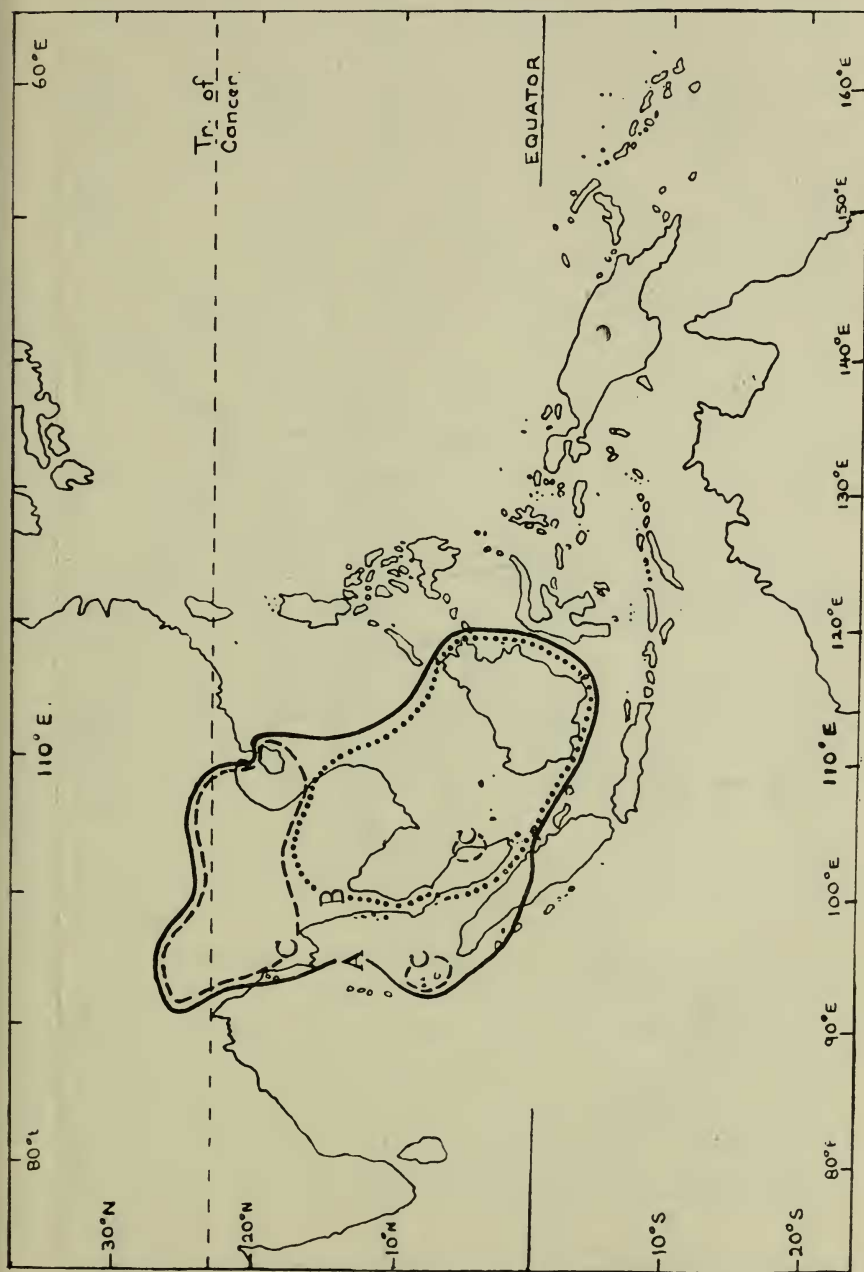
Map 1. Distribution of genus *Sphenodesme* Jack (———); Sub-section *BRACHYNEMA* (.....).



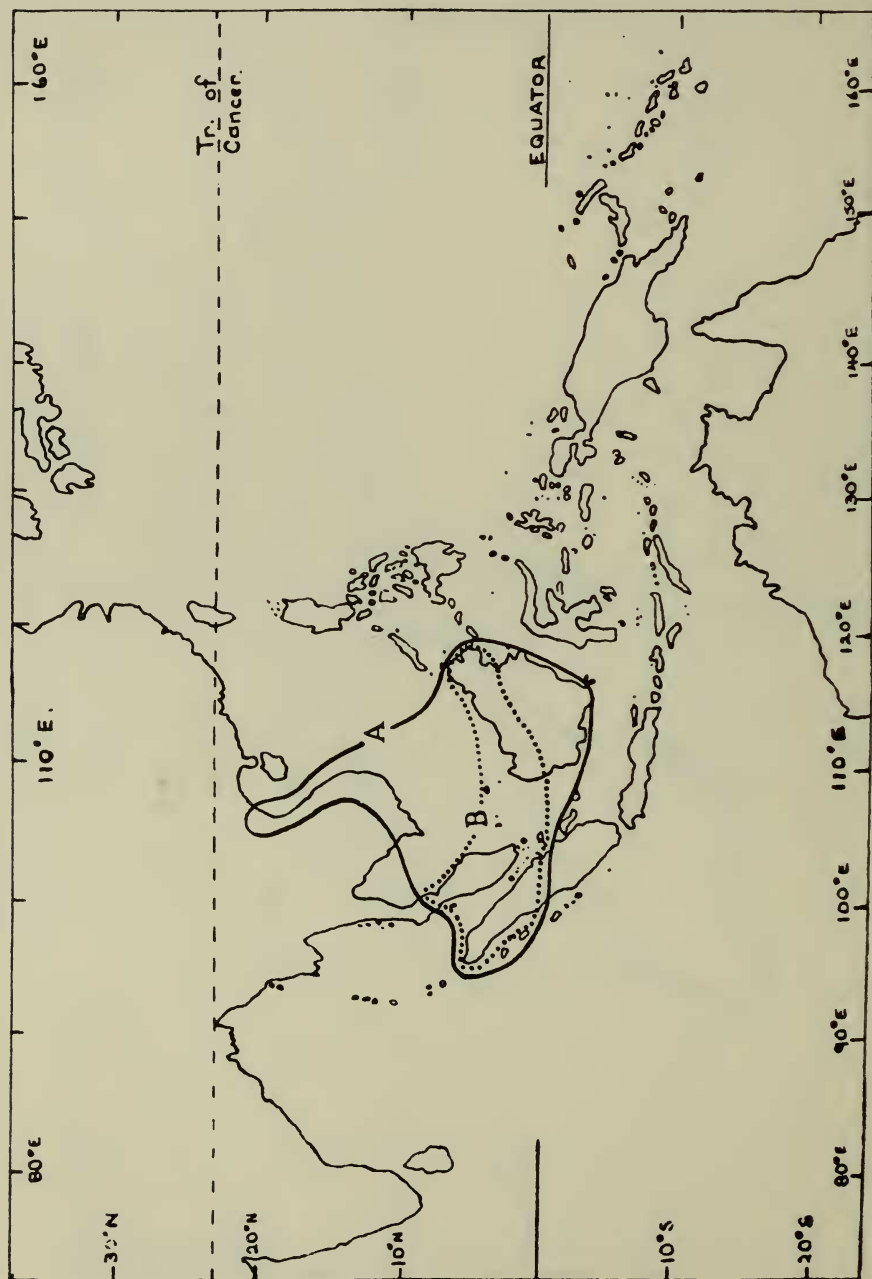
Map 2. Distribution of: *S. involucrata* (..... A); var. *paniculata* (---- B ----).



Map 3. Distribution of: Sub-section ERYCIBOIDEAE (——).



Map 4. Distribution of: Sub-section SPHENODESME (——— A ———);
S. pentandra (..... B); var. *wallichiana* (---- C ----).



Map 5. Distribution of: Sub-section PENTADONTIA (—— A ———); *S. triflora* Wight (..... B).

SUMMARY

The genus, instated as monotypic by Jack (1820), was reduced to *Congea* by Wallich (1828), Meissner (1836 & 1843) & others; but Schauer (1847) and Wight (1850) restored its status and added new species to it. In 1885, Clarke who revised the genus, described eight species, of which two were new. Since then new species were added to the genus so that Moldenke's revisions (1959, 1962 and 1963) included in the genus twenty-two species and two varieties. Of these the following are reduced as synonyms: *S. annamitica* Dop (1932) (= *S. mollis* Craib, 1912), *S. borneensis* Merr. (1917) (= *S. racemosa* (Presl) Mold., 1956), *S. clemensorum* Mold. (1953) (= *S. triflora* Wight, 1850), *S. jackiana* (Wall) Schauer (1847) (= *S. pentandra* Jack, 1820), *S. microstylis* Clarke (1885) (= *S. ferruginea* (Griff.) Briq., 1897), *S. odorata* Fletcher (1938) (= *S. involucrata* (Presl) Robinson, 1916), *S. orbicularis* Fletcher (1938) (= *S. ferruginea* (Griff.) Briq., 1897), *S. paniculata* Clarke (1885) (= *S. involucrata* var. *paniculata* (Clarke) Munir), *S. pentandra* (Roxb.) Griff. (= *S. pentandra* var. *wallichiana* (Schau.) Munir), *S. robinsonii* Dop (1914) (= *S. griffithiana* Wight, 1850), *S. smitinandi* Mold. (1962) (= *S. mollis* Craib, 1912). The var. *cordifolia* ("cordata") Dop (1914) of *S. thorelii* and var. *pubescens* Mold. (1963) of *S. involucrata* have not been maintained as these represent mere variations of the type forms.

With these reductions the accepted taxa are as follows: **amethystina**, **eryciboides**, **ferruginea**, **griffithiana**, **involucrata** and its var. **paniculata**, **mekongensis**, **mollis**, **pentandra** and its var. **wallichiana** **pierrei**, **racemosa**, **sarawakensis**, **stellata**, **thorelli** and **triflora**.

In addition the following new varieties have been created: *S. racemosa* var. **sabahensis**, *S. triflora* var. **montana** and *S. triflora* var. **riparia**.

The reasons for rejecting the typification of *S. pentandra* Jack (1820) followed by Wallich (1830) and others including Moldenke (1959) have been explained under the introduction. Thus typified *S. jackiana* becomes its synonym, and *S. pentandra* (Roxb.) Griff., its later homonym. Generally *S. ferruginea* (Griff.) Briq. (1897) has been rejected as a later homonym of *S. ferruginea* Wight (1850), but since the latter was published as a synonym of *S. barbata*, it has no status and so cannot render Briquet's combination illegitimate.

The sectional and sub-sectional divisions have been revised so that sub-section ERYCIBOIDEAE has been transferred to section BRACHYNEMA and a new sub-section PENTADONTIA has been added to the section SPHENODESME.

ACKNOWLEDGEMENT

I wish to record my gratitude to the following: to the Government of Singapore for granting me the Colombo Plan Fellowship which enabled me to undertake this research; to Mr. H. M. Burkill, Director of Gardens, Singapore, and to Dr. Chew Wee-Lek, Keeper of the Herbarium, for putting at my disposal the facilities of the Singapore Botanic Gardens; to Dr. C. X. Furtado, for his general guidance and assistance in translating French, German and Latin descriptions and in preparing the diagnoses in Latin of the new taxa; to Dr. H. N. Moldenke for the generous gifts of his valuable literature; to Che Juraimi bin Samsuri for making the drawings published here; to the typists who patiently typed the manuscript.

I also wish to thank the Directors and Curators of the following institutions for the loan of herbarium specimens and/or their photographs.

1. Arnold Arboretum, Harvard University, 22 Divinity Avenue, Cambridge 38, Massachusetts, U.S.A. (A.)
2. Botanisches Garten und Museum, Berlin-Dahlem, Germany. (B).
3. Forest Herbarium, Bangkok, Thailand. (BKF).
4. British Museum of Natural History, London, S.W.7, England. (BM).
5. Botanic Gardens, Brisbane, Queensland, Australia (BRI).
6. Botanical Museum & Herbarium, Gothersgade 130, Copenhagen K, Denmark. (C).
7. Botanic Gardens, Calcutta, India. (CAL).
8. Forest Research Institute, Dehra Dun, India. (DD).
9. Royal Botanic Garden, Edinburgh, Scotland. (E).
10. Royal Botanic Gardens, Kew, England. (K).
11. Forest Research Institute, Kepong, Selangor. (KEP).
12. Rijksherbarium, Leiden, Holland. (L).
13. The New York Botanical Garden, Bronx Park, New York 58, New York, U.S.A. (NY).
14. National Herbarium & Museum, Manila, Philippines. (PNH).
15. Trailside Nature & Science Center, Mountainside, New Jersey, U.S.A. (Herb. H.N. Moldenke).

SPHENODESME JACK

Sphenodesme Jack in Malay Misc. I, 1 (1820) 19 & in Cal. Journ. Nat. Hist. IV, 13 (1843) 43; Hook., Bot. Misc. I (1830) 258; Wight, Ic. Pl. Ind. Or. IV, part 3 (1850) 13; Schauer in DC. Prodr. XI (1847) 622; Griff., Notul. Pl. As. (1854) 181; Miq., Fl. Ind. Bat. II (1858) 909; Benth. & Hook., Gen. Pl. II, 2 (1876) 1,159; Clarke in Hook. f., Fl. Br. Ind. IV (1885) 600; Briq. in Engl. & Prantl, Nat. Pflanzenfam. IV 3a (1897) 180; Post & Kunze, Lexic. Gen. Phan. (1904) 528; King and Gamble in Journ. As. Soc. Beng. LXXIV, 4 (1909) 860; Lam, Verb. Malay. (1919) 331 & in Bull. Jard. Bot. Buit. III (1921) 99; Ridl., Fl. Mal. Penin. II (1923) 637; Gamble, Fl. Madras, II (1924) 1,104; P. Dop in Fl. Gén. Indoch. IV (1936) 898; Fletcher in Kew Bull. (1938) 441; Kanjilal & Das in De, Fl. Assam (1939) 495; Mold., Résumé Geogr. distr. & Syn. (1959) 345.

Brachynema Griff., Notul. IV (1854) 176.

Decadontia Griff., Notul. IV (1854) 175.

Roscoea Roxb., Fl. Ind. III (1932) 54, p.p.

Viticastrum Presl, Bot. Bemerk. (1844) 147; Walp., Repert. Bot. Syst. VI (1847) 691.

Congea Roxb. sensu Wall. Cat. (1828) 1735; Hook., Bot. Misc. I (1830) 285; Meiss., Plant. Vascular, 11, Comment. (1843) 200: p.p.

TYPE SPECIES: ***S. pentandra*** Jack.

Woody climber; branchlets quadrangular. *Leaves* opposite, decussate, simple, entire. *Inflorescence* panicate, axillary and terminal; cymes capitate, opposite, in the axils of leafy bracts, 3, 5 or 7-flowered; involucre bracts 6, accrescent, much longer than flowers except in *S. eryciboides*. *Calyx* shortly campanulate or tubular, 5- (rarely 6-) toothed, accrescent. *Corolla* longer than calyx, sub-regular; tube short, cylindric, as long as the calyx, villous in throat; lobes 5 (rarely 6), sub-equal, imbricate in bud. *Stamens* 5 (rarely 6 or 7), inserted in the corolla below the throat, included or exsert; anther-lobes parallel, oblong. *Ovary* 2-celled, with 2-ovules in each cell; ovules pendulous from the apex of the placentiferous axis; style long, filiform or minute; stigma 2-lobed. *Drupe* globular or obovoid, included in the capsule formed by the accrescent calyx; seed 1 (rarely 2), exalbuminous.

Distribution: Southern & Eastern India, East Pakistan, Burma, Thailand, Laos, Southern & Eastern China, Vietnam, Cambodia, Malaya, Sumatra and Borneo.

This genus was published originally as *Sphenodesme*, but the ending was "corrected" to a by Schauer (1847) & Griffith (1854), and this spelling was adopted by some authors like Clarke, Miquel, Briquet, Post & Kunze and Dop. But in this treatment, the original spelling, being correct and classical, is retained.

KEY TO THE SPECIES

1. (A) Corolla lobes oblong-ovate; stamens exsert; style filiform, long. (Calyx with or without accessory teeth)
SECTION SPHENODESME 4.
- (B) Corolla lobes oblong-obovoid, or narrowly lanceolate; stamens included; style minute or none; (calyx with no accessory teeth)
SECTION BRACHYNEMA (Griff.) Clarke 2.
2. (A) Involucral bracts shorter than calyx; stamens always 5, seated in the corolla throat and alternating with the lobes, (leaves obovate to ovate, cuneate towards base) Sub-section ERYCIBOIDEAE (Briq.) Munir
S. eryciboides
- (B) Involucral bracts much longer than the calyx; stamens usually 6, sometimes 5 or 7, seated much below the corolla throat, (leaves usually elliptic-ovate, rarely obovoid, almost always rounded at base) Sub-section BRACHYNEMA 3.
3. (A) Calyx two lipped; corolla lobes narrow lanceolate; ovary glabrous, non-glandular; (leaves ferrugineous-tomentose beneath) **S. ferruginea.**
- (B) Calyx 6-lobed or with 3 bifid lobes; corolla lobes oblong or obovoid; ovary glabrous below, glandular or minutely hairy towards apex; (leaves fulvous-pubescent beneath when young, later almost glabrous) **S. involucrata.**
 - B (a) Calyx with 6 large lobes; corolla lobes obovoid; ovary glandular towards apex **var. involucrata.**
 - B (b) Calyx with 3 large lobes, each of which is shortly bifid at apex; corolla lobes oblong; ovary setulose towards apex **var. paniculata.**
4. (A) Calyx 5-lobed, 10-ribbed and with 5 accessory teeth Sub-section SPHENODESME 8.
- (B) Calyx 5-lobed, 5-ribbed and with no accessory teeth Sub-section PENTADONTIA Munir 5.
5. (A) Corolla with a narrow villous band in throat; ovary glabrous; (leaves cuneate at base) 7.
- (B) Corolla with a broad and dense villous band in throat; ovary stellate-hairy in the upper half or wholly setose; (leaves more or less cordulate at base) 6.

6. (A) Calyx densely hirsute, lobes acute; corolla glabrous outside, mid-lobe slightly longer and villous towards its base; ovary entirely setose. (Cymes 5-flowered) **S. thorelii.**
- (B) Calyx stellately hairy without, long silky white hairs within; corolla lobes equal, puberulous outside at the apex; ovary provided with stellate hairs from the middle above; (cymes 3-4-5-flowered) **S. amethystina**
(not seen).
7. (A) Calyx densely stellate hairy without; corolla lobes puberulous on outside; (branchlets and inflorescence tawny, covered with dense stellate hairs; leaves fulvous, hairy on the veins underneath; cymes 7-flowered) **S. stellata.**
- (B) Calyx velutinous-pubescent without; corolla lobes almost glabrous on outside; (branchlets dark-brown, glabrous; inflorescence glabrous or grey-pubescent in rachis; leaves entirely glabrous) **S. triflora.**
- B (a) Cymes strictly 3-flowered; stem dark brown, glabrous and lenticellate var. **triflora.**
- B (b) Cymes 5-flowered; stem dark brown, glabrous, without lenticels; leaves chartaceous, elliptic-lanceolate, glabrous on both the sides (sometimes grey-puberulent beneath) var. **riparia.**
- B (c) Cymes 7-flowered; stem cineraceous-brown, puberulous, lenticellate; leaves sub-coriaceous, elliptic-oblong, puberulous on the nerves beneath var. **montana.**
8. (A) Calyx lobes entire 12.
- (B) Calyx lobes bifid 9.
9. (A) Calyx lobes deeply 2-fid, inflexed; accessory teeth long, linear, caudate; ovary setulose all over or thickly setose in the upper half and glabrous in the lower; (cymes 5 or 7-flowered) 11.
- (B) Calyx densely hirsute or appressedly hairy without; accessory teeth minute; ovary densely setose all over; (cymes always 7-flowered) 10.
10. (A) Calyx hirsute without; corolla throat with a narrow villous ring; (leaves glabrous underneath) **S. griffithiana.**
- (B) Calyx sericeous without; corolla throat with a broad villous ring; (leaves densely pubescent underneath) ... **S. mollis.**

11. (A) Calyx obscurely pubescent without; accessory teeth alternating with the calyx lobes; ovary setulose all over; (branchlets, leaves and involucre bracts glabrous; cymes 5-flowered) **S. sarawakensis.**
- (B) Calyx densely hirsute or appressedly hairy without; accessory teeth opposite to calyx-lobes; ovary densely setose in the upper half; glabrous in the lower; (branchlets, leaves and involucre bracts ferruginous-tomentose; cymes 7-flowered) **S. racemosa.**
 - B (a) Calyx hirsute on outside, puberulous within; corolla with a broad villous band in the throat var. **racemosa.**
 - B (b) Calyx with densely appressed hairs on both sides; corolla with a much narrower villous ring in the throat var. **sabahensis.**
12. (A) Cymes strictly 3-flowered; calyx tube glabrous within; ovary setulose above, glabrous in the lower 4th; (leaves with 1-2 pairs of main lateral nerves) ... **S. mekongensis.**
- (B) Cymes 7-flowered; calyx-tube partially or wholly hairy within; ovary densely setose all over; (leaves with 2 pairs or more of main lateral nerves) 13.
13. (A) Involucre bracts elliptic-obovate, ciliate towards the base; calyx hirsute on the outside, hispidly tomentose within. (Leaves with 2-3 pairs of main lateral nerves) **S. pierrei.**
- (B) Involucre bracts elliptic-oblong, glabrous; calyx glabrous or sparsely hairy without, glabrous within except for a narrow band of appressed hairs towards base. (Leaves with 4-6 pairs of main lateral nerves) **S. pentandra.**
 - B (a) Calyx sparsely hairy without, conspicuously lobed at apex; accessory teeth well developed, aristate var. **pentandra.**
 - B (b) Calyx glabrous without, shortly lobed or almost truncate at apex; accessory teeth minute or short even after anthesis ... var. **wallichiana.**

Section BRACHYNEMA (Griff.) Clarke

In Hook. f., Fl. Br. Ind. IV (1885) 600; Briq. in Engl. & Prantl, Pflanzenf. IV 3a (1897) 181; Mold., Résumé Geogr. distr. & Syn. (1959) 403.

Brachynema Griff., Notul. IV (1854) 176. **Basionym.**

Stamens included with short filaments seated in the corolla tube or at the throat; style minute or none; (calyx with no accessory teeth; corolla-lobes oblong-obovoid, or narrowly lanceolate).

Subsection BRACHYNEMA

Involucral bracts much longer than calyx; flowers 6-merous (rarely 5-merous); stamens seated in the corolla tube or below the throat.

TYPE: *Brachynema ferruginea* Griff. = *S. ferruginea* (Griff.) Briq.

DESCRIPTION OF SPECIES

1. *Sphenodesme ferruginea* (Griff.) Briq. in Engl. $\frac{1}{8}$ Prantl, Nat. Pflanzf. IV 3a (1897) 181; King & Gamble in Journ. As. Soc. Beng. LXXIV, 4 (1909) 861; Dop in Fl. Gén. Indoch. IV (1936) 899. **Plate 1.**

S. astylis Clarke op. cit. 601 in observ. sub. *S. unguiculata* Schauer, (lapsus calami for *S. microstylis*?): nom. nud.

S. microstylis Clarke in Hook. f., Fl. Br. Ind. IV (1885) 600; Ridl., Fl. Mal. Pen. II (1923) 638; Fletcher in Kew Bull. (1938) 442; Mold., Résumé Geogr. distr. & Syn. (1959) 345.

S. orbicularis Fletcher in Kew Bull. (1938) 208 & 442. **Syn. nov.**

Brachynema ferruginea Griff. in Notul. IV (1854) 176. **Basionym.**

Symphorema microstylis Bedd. in Clarke op. cit. pro synonym nom. nud.

TYPE SPECIMEN: Mergui, Burma (Griffith 938).

This species is easily distinguished from the others of the subsection "Brachynema", in having a non-glandular ovary, short and irregularly seated stamens, linear lanceolate corolla lobes, bi-lipped calyx, and in more dense tomentum on branchlets, inflorescence and the underside of the leaves.

Branchlets rusty stellate-tomentose, obscurely quadrangular. *Leaves* ovate or elliptic-ovate, acute to mucronulate at apex, almost rounded at base, chartaceous, sparsely hispid-pubescent especially on the nerves above, later glabrous, densely ferruginous-tomentose underneath, upto 20 cm. long, 11.5 cm. broad; main lateral nerves 5-6 pairs, the lowest pair close to the base; reticulation distinct; petiole 8-15 mm. long. *Inflorescence* rusty, stellate-tomentose; panicles axillary and terminal, spreading, 30 cm. or more long, densely covered with tawny-yellow tomentum; cymes 7-flowered with a peduncle 3-8 cm. long; involucral bracts elliptic-obovate, ferruginous-tomentose, distinctly reticulated, upto 3.5 cm. long, 1.5 cm. broad; flowers sessile. *Calyx* tubular, with no accessory teeth, 8 mm. long, densely stellate-tomentose without, appressedly hairy within, 2-lipped, usually the upper lip 2-, the lower 3-lobed; lobes minute. *Corolla* funnel shaped, 9-14 mm. long; tube pubescent without, densely villous within, 6-10 mm. long; lobes usually 6, rarely 5 or 7, linear lanceolate, acute, imbricate, pubescent on

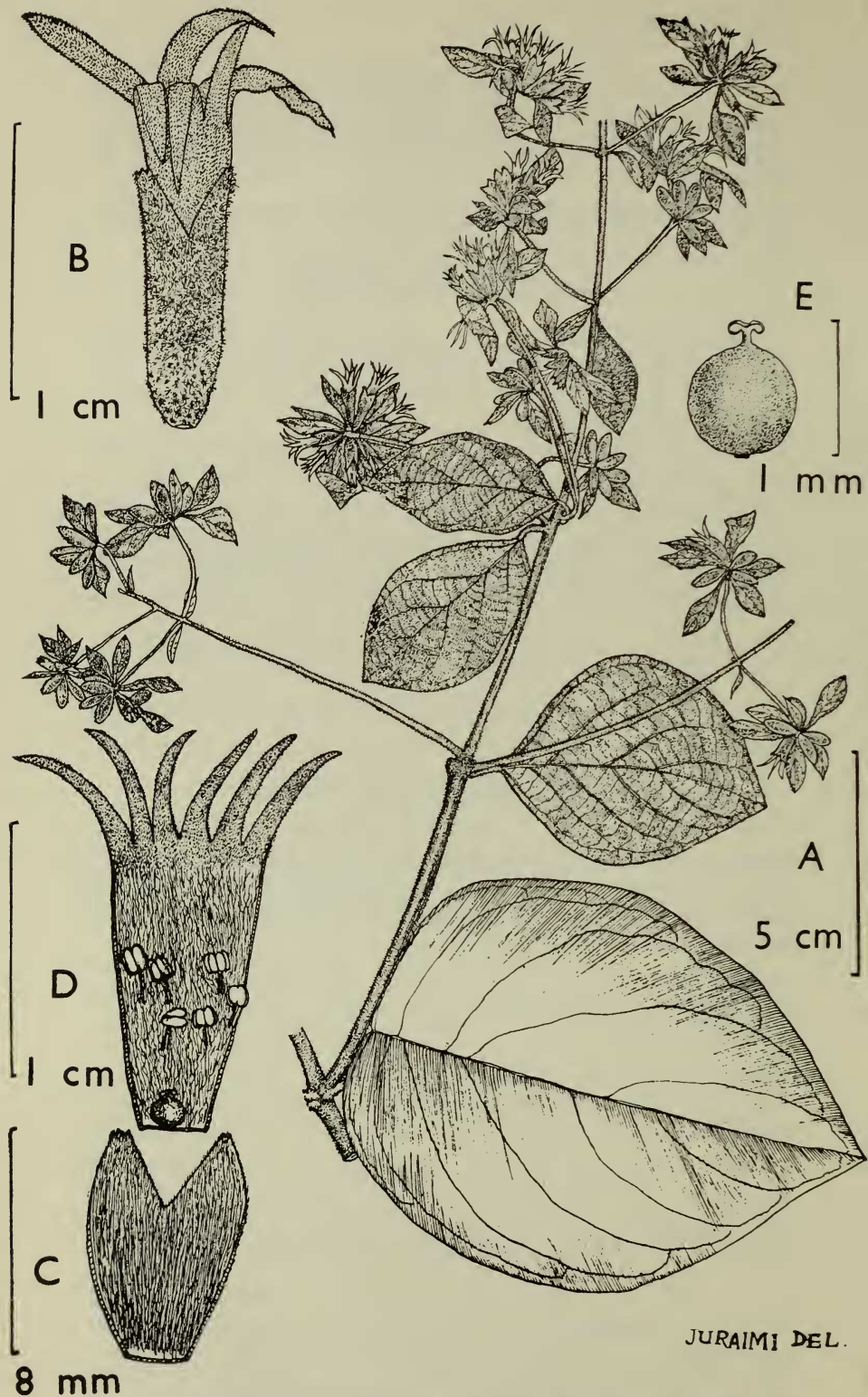


Plate 1. *Sephenodesme ferruginea* (Griff.) Briq. (Kerr 16,411 in Edin.) A, Fertile twig. B, flower. C, Calyx vertically cut open. D, Corolla cut open to show stamens and ovary. E, Ovary.

both sides, 3–5 mm. long. *Stamens* 6, or as many as the lobes, short, unequal, included, seated at different levels in the lower half of the corolla tube; filaments slender, 2–3 mm. long; anther-lobes almost oblong. *Ovary* globular to sub-columnar, glabrous, non-glandular; style minute; stigma bifid, sub-capitate.

BURMA: **Insein**, Pyinmadaw Res. (Parkinson 7: CAL). **Tenasserim**, at Tenasserim between Kankerat & Danat (Beddome's s.n.: BM, syntype of *S. microstylis*); Tavoy, (Parish s.n.: K, syntype of *S. microstylis*); Kaleinaung Res. (Ba-Pe 803: DD); Nabule (Mokim 178: BM & CAL); Mergui (Griffith, sub Kew No. 6007/1: K, syntype of *S. microstylis* and prob. Isotype of *S. ferruginea*).

THAILAND: **Kopah**, Bangsak, (Haniff & Nur 2,937: SING); Pungah, (Curtis 2,963: SING); Sriracha, (Collin 329: PNH & 585: E); Ban Don, Purat, (Seidenfaden 2,180: SING); Lamlieng, Ranaung, (Kerr 16,411: E, Holotype of *S. orbicularis*, BM, C & K); Trat, Koh Chang (Smitinand 2,237: A & BKF); Wangka, Kanburi, 200 m. (Kerr 10,305: E); Ubon, Kemarat, 100 m. (Kerr 8,376: C & E); Klawn Mayom near sea (Kerr 6,866: E); Surat, Koa Wang, 100 m. (Kerr 18,271: C & E); Nakawn Sritamarat, Ban Natawn, under 50 m. (Kerr 15,633: C & E); Koh Chang (Marcan 1,281: E; Schmidt 474 & 862: C); Salak Kawk, Kaw Chang (Rabil 28: E).

LAOS: **Vientiane**, Paksan Road, Km. 12, (Talbot 136: SING); Ban Tha Ngon Road (Talbot 98: BM & SING).

VIETNAM **Bien Hoa**, Mt. Lu, (Pierre s.n.: A & B); loc. incert. (Thorel 653: A & B); **Annam**, Dalat, (Squires 855: A, BM & SING).

Sphenodesme ferruginea (Griff.) Briq. (1897) based on *Brachynema ferruginea* Griff., Notul. IV (1854) 176 is often rejected as a later homonym of *S. ferruginea* Wight Ic. IV, part. III (1850) 13, tab. 1474, but as shown by Wight himself (Ic. p. 13, under *Congea* and again under the text of tab. 1474, p. 13), *S. ferruginea* was issued as a synonym of *S. barbata*, though he was not able to change the legend of tab. 1474 prepared earlier to be issued with the text. Since *S. ferruginea* Wight was published as a synonym, it must be regarded as not validly published (Art. 34 of 1961) and not effective in making *S. ferruginea* (Griff.) Briq. a later homonym. Hence *S. microstylis* Clarke (1885) as circumscribed in the protolog, becomes a superfluous name.

The type was from Mergui (Burma), collected by Griffith in January 1835 under No. 938 (cf. Notulae). Apparently duplicates of this collection were distributed from Kew under No. 6007/1 (Kew distr. No. 6007 = *Symphorema polyandrum*).

Beddome's specimen in British Museum bears Beddome's manuscript name "*Symphorema microstylis* Bedd.", which was given priority by Clarke in transferring the species to *Sphenodesme*.

2. *Sphenodesme involucrata* (Presl.) Robinson in Proc. Am. Acad. 51 (1916) 531; Fletcher in Kew Bull. (1938) 441; Mold., Résumé Geogr. distr. & Syn. (1959) 345 & 384, var. *involucrata*. Plate 2.

S. involucrata (Presl.) Robinson var. *pubescens* Mold. in Dansk Bot. Ark. 23, I (1963) 86. **Syn. nov.**

S. odorata Fletcher in Kew Bull. (1938) 207. **Syn. nov.**

S. paniculata Clarke sensu Gamble, Fl. Madras II, part 6 (1924) 1,104 quoad specimen Perrottet infra citata.

S. unguiculata Schauer in DC., Prodr. XI (1847) 623 pro parte (excl. syn. *Congea paniculata* Wall. Cat. 1739); Miq., Fl. Ind. Bat II (1858) 910; Clarke in Hook. f., Fl. Br. Ind. IV (1885) 601; Parkinson, For. Fl. Andam. Isl. (1923) 220; Dop in Fl. gén. Indoch. IV (1936) 900; Kanjilal & Das in De, Fl. Assam (1939) 495.

Congea ferruginea Wall. Cat. (1828) No. 1737. **nom. nud.**

C. unguiculata Wall. Cat. (1828) No. 1736 ex Walp. Rep. IV (1848) 117.

Symphorema unguiculatum Kurz, For. Fl. Burma II (1877) 255.

Vitex involucratus Presl. Bot. Bemerk. (1844) 148. **Basionym.**

TYPE SPECIMEN: Moulmein, Burma (Helfer, in Herb. DC).

Akin to *S. ferruginea* (Griff.) Briq. from which this species differs in having its calyx with distinct, acute, equal lobes, corolla with spathulate or obovoid lobes and ovary glandular towards apex. (This var. *involucrata* is distinguished from the variety *paniculata*, by its calyx being distinctly 6-lobed and its ovary glabrous).

Branchlets rusty, stellate-tomentose, obscurely quadrangular. *Leaves* chartaceous to sub-coriaceous, elliptic-oblong, acuminate, acute at apex, cuneate or rounded towards base, stellately fulvous-hairy when young, later glabrous or sparsely stellately hairy on the underside, 7.5–8 cm. long, 4–8 cm. broad; lateral nerves 5–7 pairs, stellate hairy beneath; petiole 5–15 mm. long, hairy. *Inflorescence* axillary and terminal, rusty hairy; panicles usually 15–25 cm. long, sometimes longer; cymes 7-flowered; peduncle 2–3.5 cm. long, ferruginous, stellate tomentose; involucral bracts much enlarged in fruit, elliptic-oblongate or spathulate, membranous, prominently veined, 1.5–4 cm. long, 5–13 mm. broad. *Calyx* 6-lobed (rarely 5-lobed), without any accessory teeth, campanulate, 4–6 mm. long, stellate-tomentose without; tube appressedly hairy within; lobes acute pubescent on the innerside. *Corolla* 6-lobed (rarely 5-lobed), pale yellow, 6–9 mm. long; lobes obovate, puberulous on both sides; tube puberulous without, villous within. *Stamens* 6, included, seated in corolla throat; filaments very short; anther lobes oblong. *Ovary* obovoid, glabrous, glandular in the upper third; style minute; stigma bifid. *Fruit* capsular, included in the accrescent calyx, globular, upto 8 mm. in diameter.

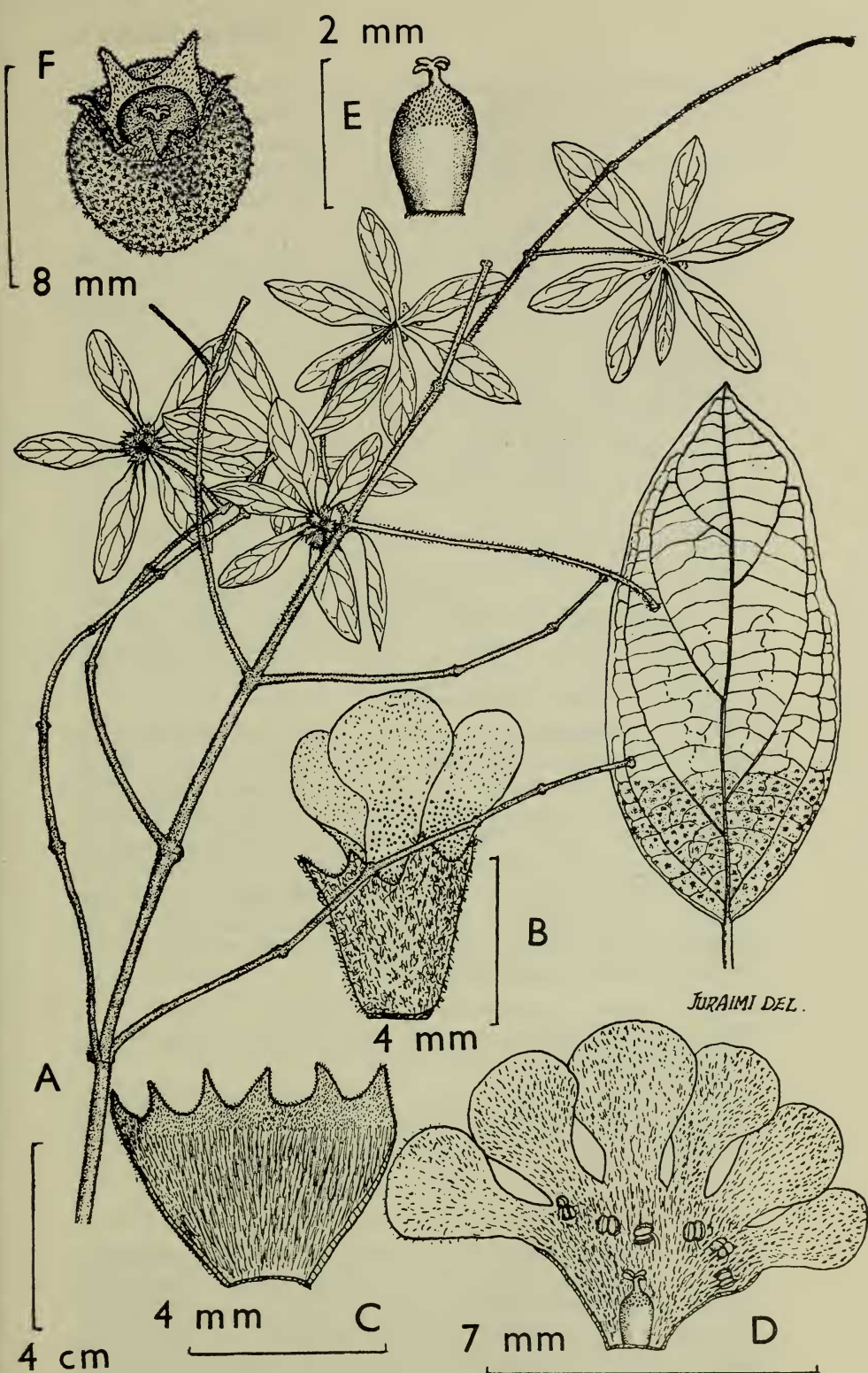


Plate 2. *Sphenodesme involucrata* (Presl) Rob. (A-E Helfer 42 in Edin.; F Lace 2,796 in Edin.).

A, Portion of inflorescence. B, Flower. C, 6-lobed Calyx vertically cut open. D, Corolla cut open to show stamens and ovary. E, Ovary glandular in the upper third. F, Capsular fruit.

INDIA: **Manipur**, Kanglatongbi alt. 3,000–3,500 ft. (Bullock 868: L, 811: A & L); **Khasia Hills**, (Hook. f. & Thomson s.n.: A, BM & L; Simon s.n.: L); loc. incert. (McLelland s.n.: E); Pundua (De Silva sub. Wall. Cat. No. 1736: BM, E & K, syntype of *Congea unguiculata*); **Madras**, Eastern Ghats, Shiveroy Hills (Perrottet 101 & 160: CAL).

ANDAMANS: Long Island (Kirat Ram 3,640: A & E); South Andaman (Heining s.n.: A & L); Chiriatapu (Parkinson 16,396: A); loc. incert. (Prain s.n. A); Hill Jungleet Anikhet (King's Collector s.n.: CAL).

NICOBARS: loc. incert. (King's Collector s.n.: BM & E; Kamphovener sub Calcutta 3,121: A & C).

BURMA: **Pyinmana** (Rogers 308: CAL & DD); **Insein** (Kau 273: CAL; Ba-Pe 10,529: DD); **Pegu** (Kurz ? 6,525: SING; Lace 6,072: E & SING); Prome (Lace 2,736: E; Beddome 6,528: BM); Tharrawaddy region (Lace 2,796: DD & E); Thaunyin (Maung 12,931: A); Salween (Chin 6,044: DD); Durat range (Kurz ? 6,527: SING); loc. incert. (Falconer 496: L); Rangoon (Parkinson 11,283: A; Beddome 6,526: BM; Meebold 14,054: CAL); **Tenasserim**. Moulmein (Helfer sub Bot. Mus. Prag. No. 42: BM, E & L, Isotypes & Herb. Bohemiae No. 54: CAL, Isotype ? - vide observ. infra; Wall. Cat. No. 1,737: BM, Syntype of *Congea ferruginea*).

THAILAND: **Chiengdao**, Me Pa Tang, alt. 440 m. (Garrett 1,210: E & L); **Lampang**, Me Salop alt. 190 m. (Winit 1,264: E); Me Luang, alt. 260 m. (Winit 1,586: E); Udawan, Sitan (Kerr 20,030: BM, C & E); **Parachimburi**, Krabin, Tungpo (Kerr 9,812: BM, C & E); **Puket**, Ranawng, Kao Talu (Kerr 1,185: E, Holotype of *S. odorata*; C & K, Isotypes); Nakawn Sawan near Kamphaengphet, alt. 100 m. (Hansen 6,629: C, holotype of *S. involucrata* var. *pubescens*); **Loei**, Wang Sapung, Pha Daeng (Suvarnakoses 1,321: BKF); N. Rachasima, National Park (Phengkhlai 574: BKF).

BORNEO: **Sabah**, Tawau, Tanjong (Pereira 43,691: SING).

VIETNAM: **Annam**, Hue (Clemens 4,143: A, BM & PNH); Nhatrang (Poilane 4,984: A).

CHINA: **Hainan**, (McClure 8,331: A, BM & E; Wang 36,301: A & E; Lau 3,113 & 28,317: A; How 73,729 & 73,733: A & BM; Chun & Tso 44,281: A & 44,669: A & B; Tang 483: A; Liang 64,243 :A; Henry s.n.: BM).

CULTIVATED: Hort. Bog. X.F. 26 & XII. B. 206; Hort. Bot. Cal. s.n.

Dr. J. W. (or F.) Helfer, a physician from Prague in Czechoslovakia, collected plants in Tenasserim and the Andamans from 1832 onwards until his murder in 1840 in the Andamans (Backer, Verklarend Woordenboek, 1936). His collection from Tenasserim, generally referred in old books as Martabania, seems to have been made between 1832-1838. Hence the specimens distributed in

1937 by the National Museum of Botany, Prague, as having been "in Bengalia Circa Calcuttam" seem to be erroneously labelled as to the locality, as the two instances given here will show, though Helfer himself might have used "Bengalia" indifferently to denote any country in the Bay of Bengal.

Thus Helfer's specimen named by Clarke as *Sphenodesma griffithiana* Wight (Kew distr. No. 6,008) was collected at Tavoy in January 1838. What appear to be the duplicates of this Helfer's collection, have been determined by K. Biswas as *Sphenodesma pentandra* Jack and distributed from Prague under No. 43 as coming from "Bengalia Circa Calcuttam". The type of the species was from Mergui, Tenasserim, collected by Griffith, and though the species has been recorded from the regions east of Tenasserim (e.g. Indochina), it has never been recorded from anywhere north of Burma, much less from Calcutta or Bengal. Similarly K. B. Presl, a science professor at Prague (cf. Baker op. cit.) based his *Vitex involucratus* (Bot. Bemerk., 1844 p. 148) on a specimen from "Moulmein in Martabania". Obviously the same specimen in Herb. DC. was seen and quoted by J. C. Schauer in De Cand., Prodr. XI (1847) 623, as "Moalmine Martabaniae (Helfer!)" under his *Sphenodesma unguiculata* to which he had reduced Presl's species (which he had apparently seen in De Candolle's herbarium). Now, what appear to be the duplicates of this type collection have been distributed first as Reliquae Helferianae from Herbarium Musei Regni Bohemiae bearing a No. 54 and again in 1937 as from Section Botanica Musei Nationalis Pragae with a printed No. 42, both determined by Biswas as *Sphenodesma unguiculata* Schauer and both as coming from "Bengalia Circa Calcuttam," though this species has never been recorded from anywhere near Calcutta, nor even from Bengal, and though it is not recorded that Helfer collected in Bengal. In view of the evidence given above, it seems reasonable to regard the last named collections distributed from Bohemia or Prague as the duplicates or isotypes of the holotype of *Vitex involucratus* Presl, which was collected at Moulmein in Tenasserim.

B. L. Robinson seems to have made the combination under *Sphenodesme* because Presl's binomial has the priority right over *S. unguiculata*, under which Presl's species was cited; there is no indication that he had tried to locate or identify Presl's holotype.

An unusual distribution for this species is indicated by Perrottet's specimens collected on Shiveroy Hills in the Eastern Ghats (S. E. India), referred by Gamble to *S. paniculata*.

According to a note in Flora Malesiana I (1950) 136 & 137, Galathea Expedition Numbers 3,001-3,134 come from Buitenzorg, but Kamphovener collections quoted above are stated to be Calcutta numbers. I have no means of deciding whether these numbers are the same. If identical, then Kamphovener 3,121 quoted as from Nicobar must have been from Buitenzorg (Bogor), in which case it must have been from a cultivated plant.

2a. **Sphenodesme involucrata** (Presl) Robinson var. **paniculata** (Clarke) Munir stat. nov. Plate 3.

S. paniculata Clarke in Hook. f., Fl. Br. Ind. IV (1885) 600; Gamble, Fl. Madras II, part 6 (1924) 1,104, pro parte; Mold., Résumé Geogr. distr. & Syn. (1959) 164. **Basionym.**

Congea paniculata Wall. Cat. (1828) No. 1,739. Herb. Heyne, and No. 1,739B Herb. Wight: nomen nudum.

This variety is easily mistaken with the type form, but differs in having its calyx with 3 large rounded lobes, each of which bearing a small slit at the apex; corolla with elongate-oblong lobes and ovary setulose towards the apex.

TYPE SPECIMENS: Malabar, S. India (Heyne sub Wall. Cat. No. 1,739-K, lectotype).

INDIA: **Malabar**, Cochin (Johnstone s.n.: K, syntype, A); Koorg (Heyne, Wall. Cat. No. 1,739: K, lectotype; Rottler's Herb. - K, syntype); Travancore (Bourdillon 126: CAL). **South India**, loc. incert. (Wight 910: E, & Wall. Cat. No. 1,739B: BM, E & K).

BURMA: **Tenasserim**, Tharapau (Meebold 14,407: CAL).

Meebold's collection from Tenasserim in Burma gives this variety an unusual distribution, since all the other collections are from the western parts of South-West India. Could there have been an exchange of labels with Perrottet's collection from the Shiveroy Hills in South-East India, which gives an unusual distribution to the type form (var. *involucrata*) of the species?

Externally the specimens of var. *involucrata* & var. *paniculata* look very alike, and those who go by geography, have named all South Indian specimens of these two groups as *paniculata* and the Tenasserim specimens as *involucrata*, while others who were not able to recognize any difference between the two forms, have assigned the specimen of var. *paniculata* to var. *involucrata*. Unfortunately all the available descriptions are insufficient to distinguish between those two taxa. But a careful examination has revealed that these varieties can be easily distinguished by the division and shape of the calyx-lobes, by the size and shape of corolla lobes and the absence or presence of indumentum on the ovary.

The syntypes of *Sphenodesme paniculata* Clarke are cited as "Kurg, Rottler" and "Cochin, Johnstone". But Clarke also quoted "*Congea paniculata* Wall. Cat. 1739" in the synonymy of the species, and Wallich in his Catalogue noted that the specimen thus named was from Heyne's herbarium. Hence the question arises: Were there three syntypes to Clarke's species? If so, why the third one is not mentioned by Clarke in the citations or by any subsequent botanist?

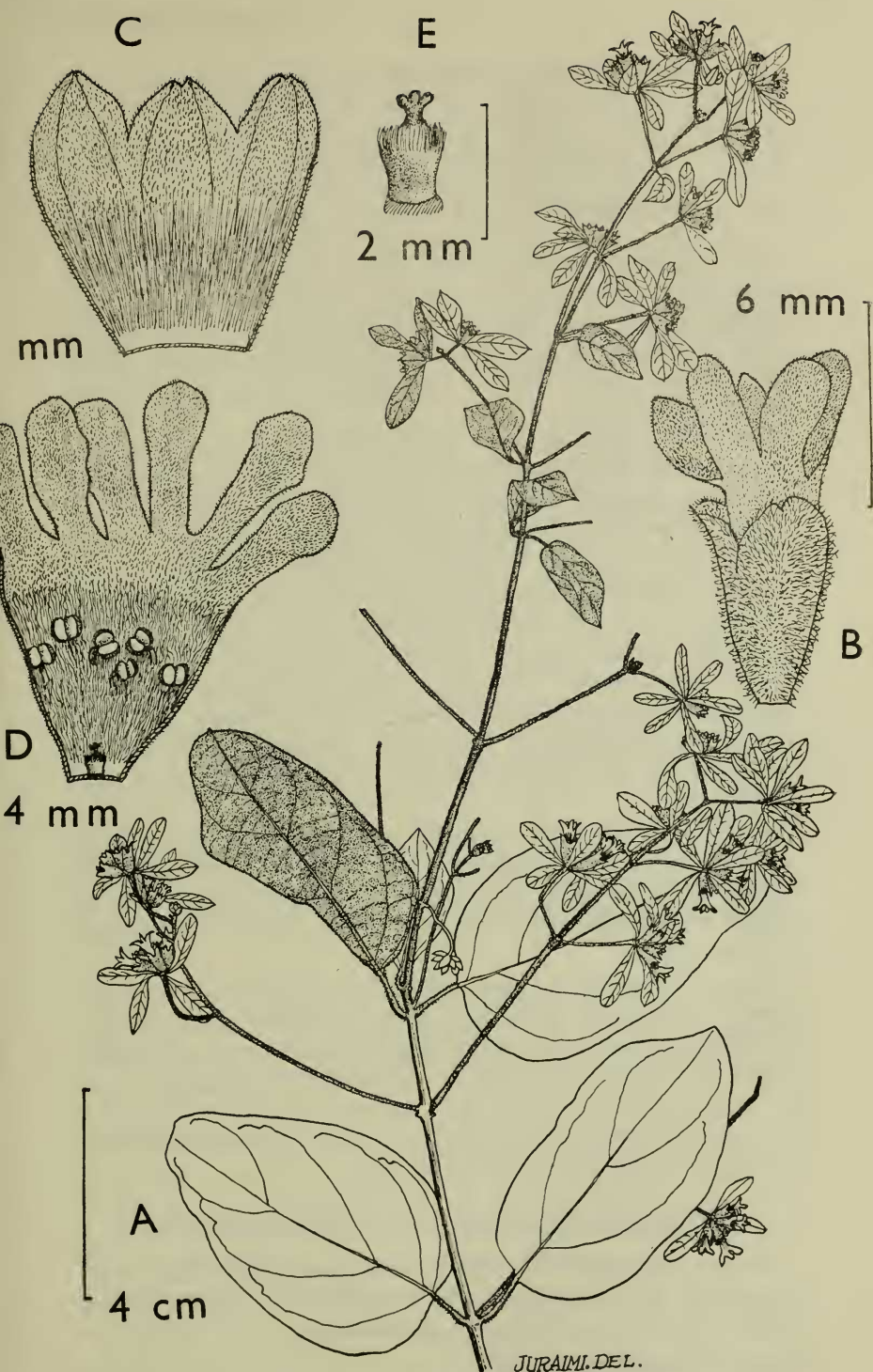


Plate 3. *S. involucrata* var. *paniculata* (Clarke) Munir (Johnstone s.n. in Arn. Arboretum).

A, Inflorescence. B, Flower. C, 3-lobed calyx cut open longitudinally. D, Corolla opened out to show the disposition of the stamens and ovary. E, Ovary showing setulae towards apex.

In trying to solve this problem, the remarks of Wight & Arnott in Prodr. Fl. Pen. Ind. or. I (1834) XII & XXXV are of value. According to them, Heyne's collections from "Mysore & southern provinces" of India were named by Rottler (p. XIII), while "Herb. Rottler" was an abbreviation adopted to indicate specimens that were either found thus named in Rottler herbarium or so named by him from another herbarium (p. XXXV.) Since Wallich is quite definite that his No. 1739/1 had come from Heyne's Collection it seems obvious that the specimen in Rottler's Herb. may be regarded as also from Heyne's Collection. One of the Kew specimens is definitely indicated by Wallich as from Heyne's Herb., but the other, also in Kew, is from Rottler's Herb. with Coorg as its collection locality.

From the Royal Botanic Garden, Edinburgh, two specimens were received from Wight's Herb. both of which were originally named "Symphorema". One of them was later named "*Congea paniculata* ? an prob. *Symphorema* n. sp. Wall. Cat. 1739," which in the Herbarium of Glasgow University is associated with "Arnott," either as the collector or the annotator of the specimen. Obviously this is the specimen included under *Congea paniculata* in Wallich's Cat. Suppl. p. 86 as "1739B Herb. Wight." The second is numbered "910". The precise localities of both these specimens are not known. However, most of Wight's collections were from Courtallum in Tinnevelly (Tirunelveli) district, South India, though he had also collected in the Nilgiris and at Cape Comorin.

Actually there is no fundamental difference between these specimens and their duplicates. But as Heyne's specimen had formed the basis of *C. paniculata* from which Clarke took his specific epithet, the latter specimen is to be preferred if a lectotype is to be selected.

Since "Symphorema Heyne Herb." was quoted by Wallich under his *Congea paniculata*, some botanists (e.g. Walpers, Moldenke, Schauer) have taken to mean that Heyne had actually validly or invalidly published the "*Symphorema paniculata*", but no such binomial seems to have been ever published; though it was used on Heyne's Herb. Collections. There is no need therefore to load the synonymy with this biverbal.

Sub-section ERYCIBOIDEAE (Briq.) Munir **comb. nov**

Section *Eusphenodesma* Clarke, sub-section *Eryciboideae* Briq. in Engl. & Prant, Pflanzenf. IV 3a (1897) 181; Mold., Résumé Geogr. distr. & Syn. (1959) 403. **Basionym**.

TYPE: *S. eryciboides* Kurz

Involucral bracts shorter than calyx; flowers 5-merous; stamens seated at the corolla throat.

3. **Sphenodesme eryciboides** Kurz in Journ. Asiat. Soc. Beng. XL, part II, (1871) 76 (= Fl. Burma (1871) 345); Clarke in Hook. f., Fl. Br. Ind. IV (1885) 601; Mold., Résumé Geogr. distr. & Syn. (1959) 166 & 345. **Plate 4.**

Symphorema grossum Kurz in For. Fl. Burma, II (1877) 254.

TYPE SPECIMEN: Pegu, Burma (Brandis 879-K).

Among the species having included stamens and minute style, this is readily distinguished by its involucre bracts being shorter than the calyx, leaves obovate to ovate, and stamens always five and seated in the corolla throat.

Branchlets rusty villous or sub-tomentose. *Leaves* obovate to oval-oblong, rounded at apex, cuneate towards the base, chartaceous, glabrous above, pubescent or tomentose beneath, upto 15.5 cm. long, 8.5 cm. broad; lateral nerves 6-7 pairs, prominent beneath; reticulation distinct; petiole 1-1.5 cm. long, more or less thickly pubescent. *Inflorescence* axillary and terminal; panicles tomentose, 5-10 cm. long; rachis longitudinally grooved in the internodes; cymes 7-flowered, yellowish white, with a peduncle 1-2 mm. long; involucre bracts shorter than the calyx, unequal, oblong-spathulate, pubescent, 2-3.5 mm. long; flowers sessile. *Calyx* about 5 mm. long with lobes 5, rarely 6, without any accessory teeth; lobes acute, tomentose; tube tomentose without, appressedly hairy within. *Corolla* white, 6-10 mm. long, narrowly funnel-shaped, 5-lobed, puberulous without, villous in throat, glabrous below; lobes obovate to oblong, puberulous on both the sides. *Stamens* 5, included; filaments minute; anther lobes almost orbicular. *Ovary* glabrous, glandular in the upper third; style minute or none; stigma 2-lobed.

BURMA: **Pegu**, Bassein, Chaungtha Chaung (Lace 3,037: DD, E & SING); Salween Distr. (Chin 6,834: DD); loc. incert. (Brandis 879: K, holotype); **Tenasserim** (Helfer, Kew distr. No. 6,011: A; Gallatly 577: CAL).

THAILAND: **Kanburi** (Kerr 10,563: A, E & L).

Apparently the holotype (Brandis 879 from Pegu) was preserved in Calcutta where Kurz had kept his herbarium. Later this specimen or its part was sent by Dr. King to Clarke in Kew where it is preserved. I have seen its photograph.

Moldenke op. cit. (1959) 166, regards this species as an endemic in Upper Burma, though Clarke had quoted it also from Tenasserim in Lower Burma. More recently the species has been collected at Kanburi in Thailand.

The species is peculiar in the genus in its involucre bracts being shorter than the calyx.

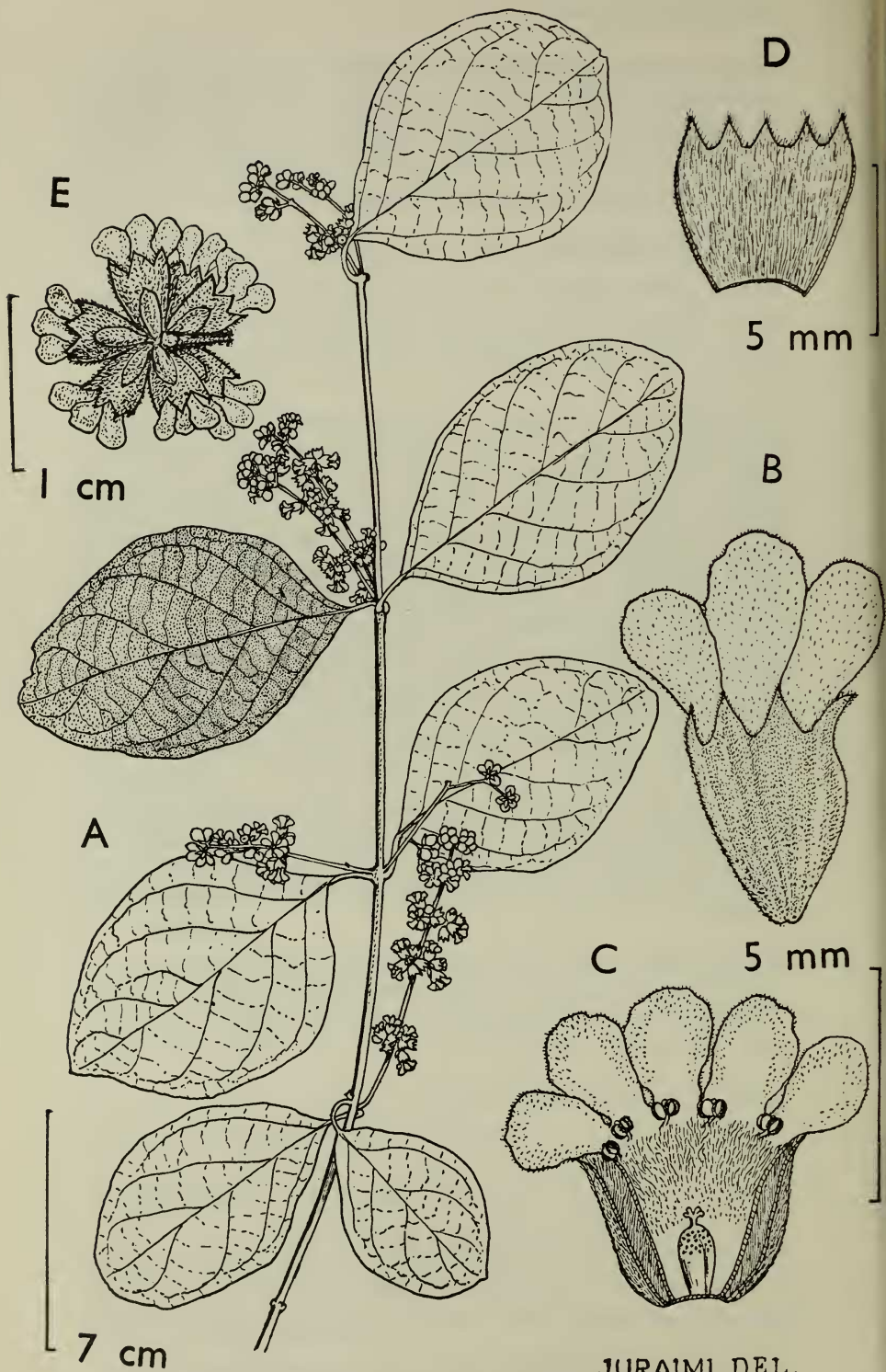


Plate 4. *Sphenodesme eryciboides* Kurz (Lace 3,037 in Edin.).

A, Fertile twig. B, Flower. C, Ibid, cut open to show the disposition of stamens and ovary. D, Calyx vertically cut open. E, Cymes to show the length of the involucre bracts.

Section SPHENODESME

Eusphenodesma Clarke in Hook. f., Fl. Br. Ind. IV (1885) 601; Briq. in Engl. & Prantl Pflanzenf. IV 3a (1897) 181; Mold., Résumé Geogr. distr. & Syn. (1959) 403.

Sub-section *Bracteosae* Briq. in Engl. & Prantl Pflanzenf. IV 3a (1897) 181; Mold., op. cit. (1959) 403. **syn. nov.**

Stamens and style long, exsert; (calyx with or without accessory teeth; corolla-lobes oblong-ovate).

Sub-section SPHENODESME

Decadontia Griffith, Notul. IV, (1854) 175.

TYPE: *S. pentandra* Jack.

Calyx 10-ribbed, with 5 entire or bifid lobes and with 5-accessory teeth.

4. *Sphenodesme griffithiana* Wight, Ic. IV, 3 (1850) 14 t. 1477; Clarke in Hook. f., Fl. Br. Ind. IV (1885) 602; Lam, Verb. Malay. Pen. (1919) 334 & in Bull. Jard. Bot. Buit III (1921) 99; Dop in Fl. gén. Indoch. (1936) 906; Mold., Résumé Geogr. distr. & Syn. (1959) 166 & 345 **Plate 5.**

S. jackiana (Wall.) Wight, Ic. (1850) quoad t. 1477 tantum.

S. robinsonii Dop in Bull. Soc. Bot. France LXI (1914) 318 & Fl. gén Indoch. (1936) 903; Mold., Résumé Geogr. distr. & Syn. (1959) 177 et suppl. IV, p. 8, & in Dansk Bot. Ark. 23, I (1963) 86, **Syn. nov.**

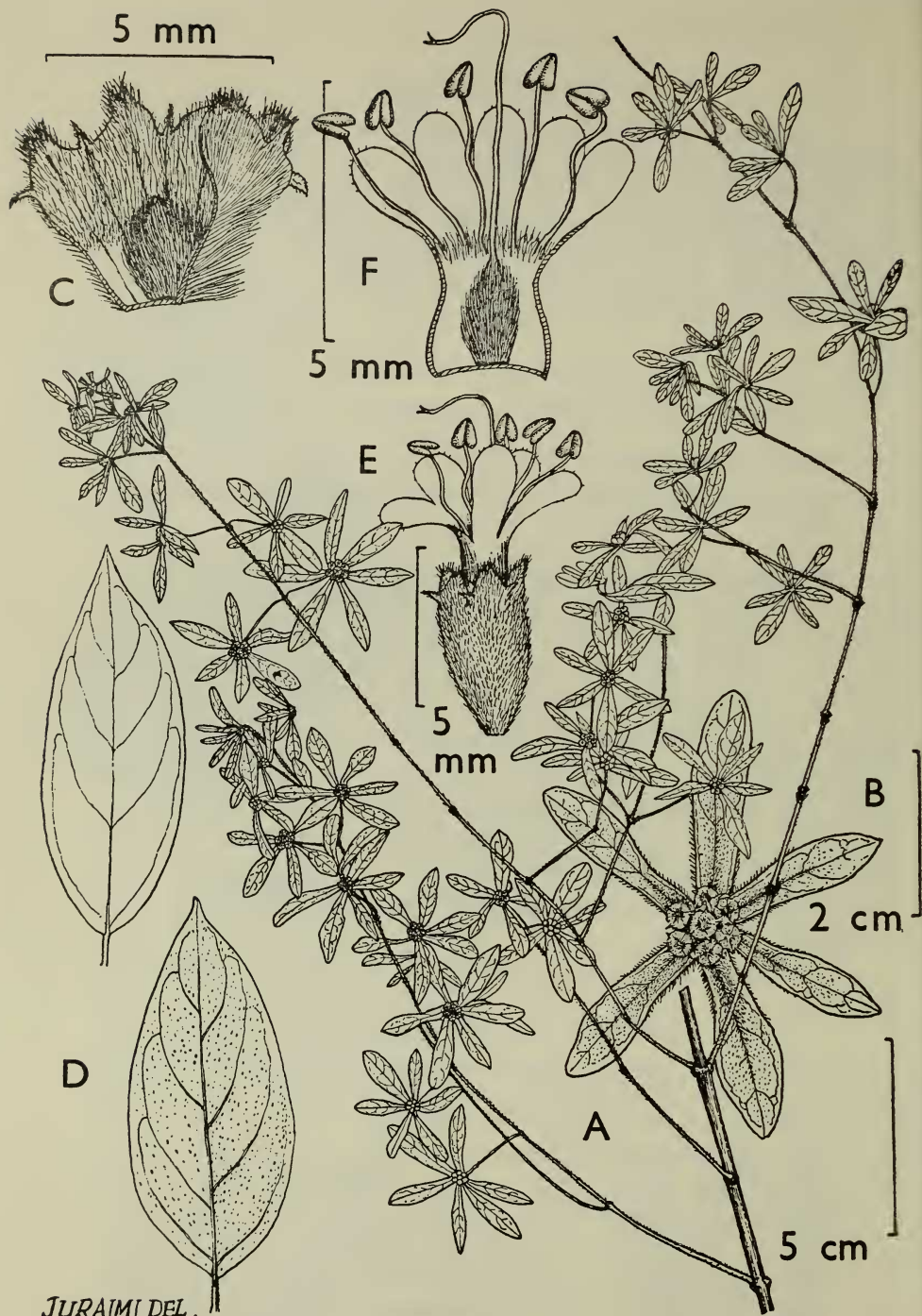
Decadontia coerulescens Griff., Notul. IV (1854) 175, **Typonym.**

Symphorema pentandrum Kurz, For Fl. Burma, II (1877) 255.

TYPE SPECIMEN: Mergui, Burma (Griffith 903-E).

This species is easily distinguished from its closest ally *S. mollis*, by its leaves being glabrous, calyx densely hirsute outside and corolla-throat with a narrow villous ring.

A scandent shrub; branchlets quadrangular, glabrous, lenticellate. *Leaves* ovate-oblong, acute-acuminate at apex, somewhat rounded at base, almost nitid above, dull below, glabrous, chartaceous to subcoriaceous, upto 10.5 cm. long, 5 cm. broad; petiole 5–8 mm. long; lateral nerves 4–6 pairs. *Inflorescence* axillary and terminal, lax, 12–30 cm. long; rachis tetra-angular, puberulent when young later glabrous, densely ciliate at nodes; cymes 7-flowered, peduncle pubescent, upto 2.5 cm. long; involucre bracts oblong-obovate, obscurely mucronate at apex, puberulous, pilose in the margins and the mid-vein on the basal half, 15–23 mm. long, 4–7 mm. broad. *Calyx* with 5-lobes and 5 accessory teeth, about 4 mm.



JURAIMI DEL.

Plate 5. *Sphenodesme griffithiana* Wight (A-C Griffith 903 in Edin.; D-F Robinson 1,464 in Arn. Arboretum).

A, Portion of an inflorescence. B, Cyme after anthesis. C, Calyx cut open to show ovary. D, Leaves. E, Flower. F, Corolla cut open to show ovary and stamens.

long, hirsute all over except at the base of the tube; lobes 2-fid, hirsute; accessory teeth situated below the sinuses, hirsute. *Corolla* infundibuliform, 5-lobed, 5 mm. long, glabrous, with a narrow, villous band in the throat at the insertion of stamens and obscurely fimbriate in the margins of the lobes. *Stamens* 5, exsert; filaments slender; anther-lobes oblong. *Ovary* densely setose, glandular; style exsert, filiform; stigma shortly bifid.

BURMA: **Tenasserim**, Mergui (Griffith 903: E, holotype of the species and of *D. coerulescens* & K, Isotype; Meebold 14,150: CAL; Proudlock 45: CAL); Tavoy (Helfer: Kew distr. No. 6,008: K, & Bot. Mus. Nat. Prag. No. 43: BM, E & L); loc. incert. (Packman 67: BM; Parkinson 1,940: DD).

VIETNAM: **Annam**, Nhatrang (Robinson 1,464: A, Isotype of *S. robinsonii*; Poilane 3,232: A. paratype); Phan-rang (Alleizette s.n.: L).

Apparently Dop based his *S. robinsonii* on a variation of the species differing in the shape and size of calyx-lobes and the accessory teeth; but an examination of duplicates of the types shows no material differences from *S. griffithiana*, to which it is here reduced.

As to the status of Helfer's specimens distributed from the National Museum of Prague in 1937, see remarks under *S. involucrata*.

5. **Sphenodesme mollis** Craib in Kew Bull. (1912) 154; Dop in Fl. gén. Indoch. (1936) 904; Fletcher in Kew Bull. (1938) 443; Mold., Résumé Geogr. distr. & Syn. (1959) 178. **Plate 6.**

S. annamitica Dop in Bull. Soc. Hist. Nat. Toulouse LXIV, (1932) 573 & Fl. gén. Indoch. (1936) 907; Mold., Résumé Geogr. distr. & Syn. (1959) 176. **Syn. nov.**

S. smitinandi Mold., Phytologia VIII, No. 8 (1962) 393. **Syn. nov.**

TYPE SPECIMEN: Sriracha, Thailand (Kerr 2,075-K).

This species is allied to *S. griffithiana* from which it is easily distinguished by its leaves being densely pubescent underneath, calyx sericeous without and corolla densely villous in the throat.

Branchlets tomentose to pubescent, later glabrous; bark lenticellate. Leaves elliptic-oblong, acute-acuminate at apex, cuneate towards base, chartaceous-subcoriaceous, pilose on the upper surface, softly pubescent or tomentose beneath, 4-12 cm. long, upto 8.5 cm. broad; lateral nerves 5-6 pairs, more prominent beneath; petiole upto 12 mm. long, tomentose. *Inflorescence* in axillary and terminal panicles, tomentose; cymes 7-flowered; involucre bracts spatulate to oblanceolate-spatulate, obscurely apiculate, pubescent-tomentose, distinctly ribbed, 2.5 cm. long, 6

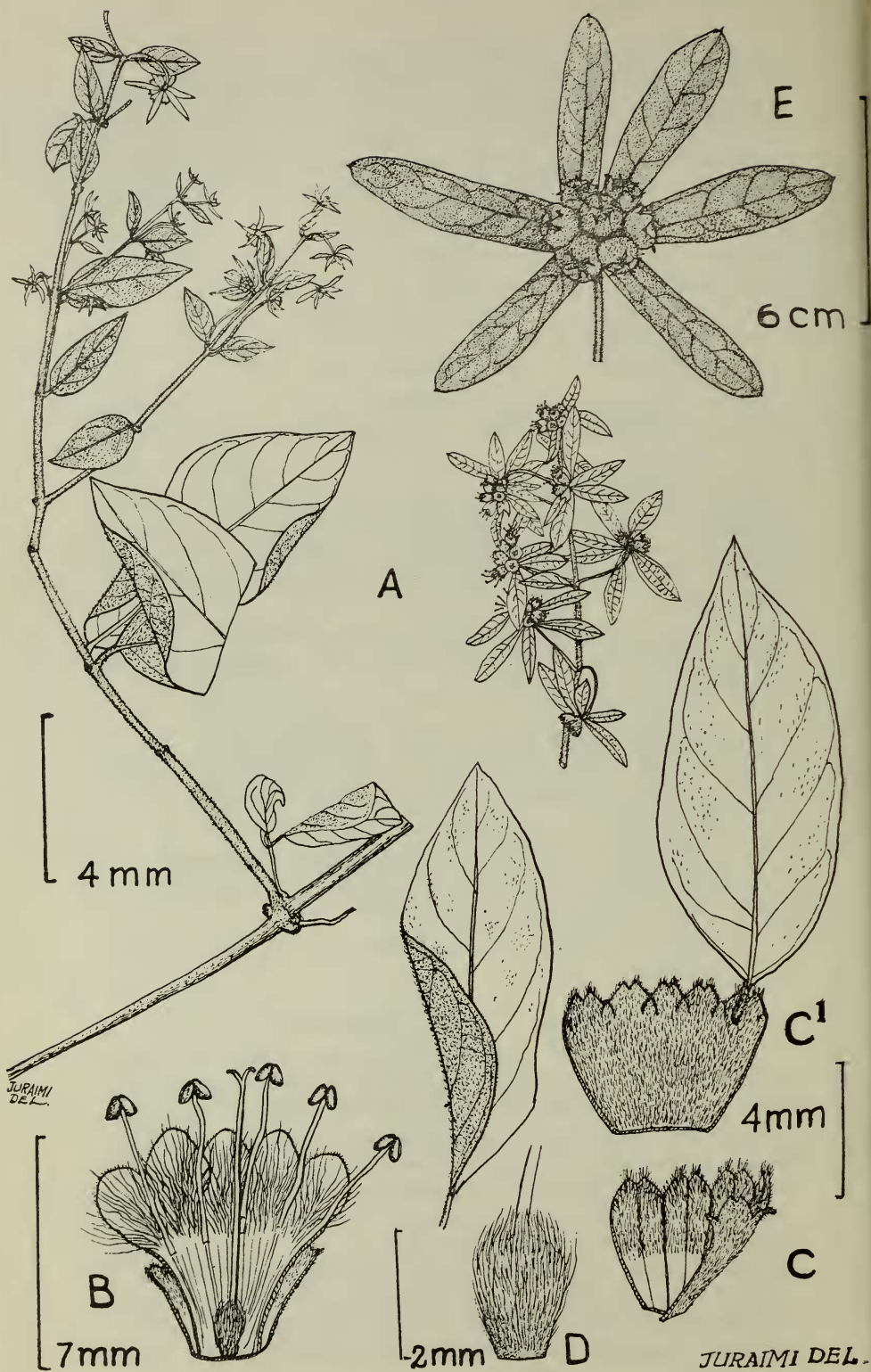


Plate 6. *Sphenodesme mollis* Craib (A-D Kerr 2,075 in Edin.; E Kerr 9,688 in Edin.).

A, Twig with leaves and inflorescence. B, Flower longitudinally cut open to show inside. C, Calyx cut open to show outside

mm. broad. *Calyx* 4.8 mm. long with 5 lobed and 5 accessory teeth; tube sericeous-tomentose without, pubescent within in the upper half, glabrous in the lower-half; lobes slightly 2-fid, sericeous-tomentose; accessory teeth small, seated externally below the sinuses of calyx-lobes. *Corolla* infundibuliform, 5-lobed, glabrous without, villous in throat, about 8 mm. long; lobes oblong, ciliate at margin. *Stamens* 5, exsert. *Ovary* ovoid, setose, about 1 mm. long; style slender, exsert, ± 6.5 mm. long; stigma bilobed.

THAILAND: **Korat**, Pak Chawng, alt. 300 m. (Marcan 1,590: E); Rachasima, Pak Chawng, alt. 200 m. (Smitinand 4,852 in Herb. Moldenke, Yonkers, N.Y., holotype of *S. smitinandi* Mold.); **Chantabun**, Tap Sai, alt. 200 m. (Kerr 9,688: E); **Sriracha**, Nawng Kaw (Kerr 2,075: E, Isotype, & K-Holotype); loc. incert. Put 457: E); **Saraburi**, Mauk Lek, alt. 200 m. (Kerr 9,117: C & E); Keng Koi, Ban Nawng Bua (Put 1,107: E); **Petchaburi**, Bo Tai (Marcan 552 & 2,739: E; Kerr 11,063: E); **Prachuap**, Hua Hin (Kerr 13,436 & Marcan 2,227: E); Sam Roi Yawt (Kerr 10,966: E); **Kanburi** (Kerr 10,107: E); Ban Ting Na Nang Rauk, alt. 100 m. (Burkill Jr. 1,260: SING); **Chanburi**, Pong Namrawn, Taru, ang. alt. 570 m. (Sangkha Chand 555: A & BKF); **Koh Sichang** (Nielsen 644: C). **Tha Ki Len** (Larsen 8,326: C); Sai Yok (Larsen 8,462 & 9,051: C); **Ban Kao** (Larsen 8,048: A & C).

VIETNAM: **Annam**, Phan-Rang, Ba Ran (Poilane 9,637: A, syntype of *S. annamitica*); Nhatrang, Phu Hu (Poilane 5,342: A, syntype of *S. annamitica*).

CHINA: **Yunnan**, loc. incert. (Henry 13,225: BM & E).

CULTIVATED: Bangkok (Kerr 11,035: E).

The adult leaves in Larsen's Nos. 8,048, 8,326 & 9,051 and Henry's No. 13,225, are almost glabrous. But, the younger leaves and other floral characters agree with the holotype; the absence of indumentum in mature leaves may therefore be a response due to age.

6. **Sphenodesme sarawakensis** Moldenke Revista Sudam. Bot. X (1956) 230, & Résumé Geogr. distr. & Syn. (1959) 193.
Plate 7.

TYPE SPECIMEN: Sampadi Hill, Sarawak (Native Collector 5,227-NY).

Akin to *S. racemosa* in having 10-ribbed calyx with deeply 2-fid and inflexed lobes and well developed aristate accessory-teeth, but differs in its branchlets, leaves, and involucre bracts being always glabrous, cymes 5-flowered, calyx obscurely pubescent without, accessory teeth alternating with the calyx lobes and ovary setulose all over.

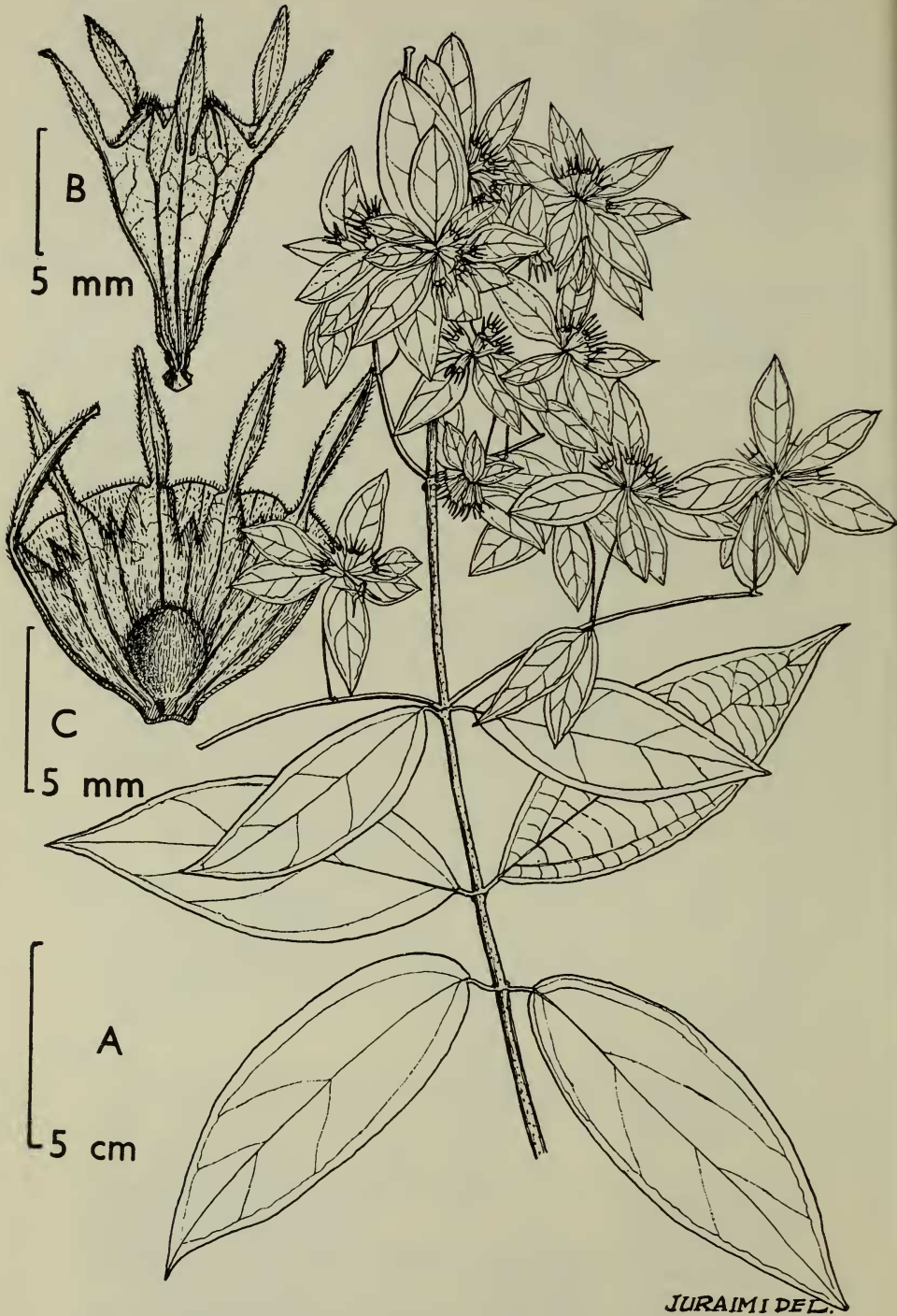


Plate 7. *Sphenodesme sarawakensis* Mold. (Native Collector 5,111 in Arn. Arboretum).

A, Inflorescence. B, Flower with its corolla, stamens and style fallen off. C, Calyx cut open to show ovary.

Branchlets dark brown, obscurely quadrangular, lenticellate, glabrous. *Leaves* chartaceous, elliptic-lanceolate, acuminate at apex, cuneate towards base, glabrous on both the sides, dull greenish above, brown below, 5–13.5 cm. long, 2–4 cm. broad, conspicuously reticulated beneath; lateral nerves 3-pairs, rarely 4 pairs; intramar-ginal nerve conspicuous on the underside; petiole about 5 mm. long. Panicles axillary and terminal, spreading, puberulous in the rachis when young, later glabrous, upto 20 cm. long; cymes 5-flowered; peduncle 2.5–3.5 cm. long, puberulent, slender; involucre bracts 6, membranous, elliptic or ovate-elliptic, apiculate at apex, attenuate towards the base, brown on drying, puberulous when young, later glabrous, 1.5–3 cm. long, 5–12 mm. broad. *Calyx* (fruiting) 5-lobed and with 5 accessory teeth, campanulate, 10-ribbed; lobes deeply bifid, aristate, inflexed; accessory teeth linear caudate, erect, obscurely hairy, alternating with the lobes, 3–5 mm. long; tube pubescent within, obscurely hairy outside, 6–8 mm. long. *Corolla* . . . ? *Stamens* . . . ? *Ovary* obovoid, grey setulose, 2–3 mm. long.

SARAWAK: Mt. Stupang, alt. 100 m. (Native Collector (Jantan) 5,191: A); Mt. Mating (Native Collector 5,111: A).

As the type material was not available for consultation, this species has been identified only from the description. Recently the author has confirmed that the duplicates of these two afore-mentioned specimens in the Britton Herbarium of the New York Botanical Garden, are identical with the holotype of the species.

The taxon is described as having 6 or 7 flowered cymes, but in the two specimens cited above the cymes are always 5-flowered.

7. ***Sphenodesme racemosa*** (Presl) Mold. in Revista Sudam. Bot. X, No. 7 (1956) 230, & Résumé Geogr. distr. & Syn. (1959) 391. var. ***racemosa***. Plate 8.

S. barbata Schauer in DC., Prodr. XI (1847) 623; Wight, Ic. Ind. Or. IV (1850) 13 t. 1474 & Illust. Ind. Bot. (1850) 217, fig. 173–b6; Miq., Fl. Ind. Bat. II (1858) 910; Clarke in Hook f., Fl. Br. Ind. IV (1885) 601; Briq. in Engl. & Prantl, Nat Pflanzf. IV 3a (1897) 181; King & Gamble in Journ. As. Soc. Beng. LXXIV, 4 (1909) 862; Lam, Malay. Verb. (1919) 333 & in Bull. Jard. Bot. Buit. III (1921) 99; Merr., Bibl. En. Born. pl. (1921) 518; Ridl., Fl. Mal. Pen. (1923) 638; Merr. in Univ. Cal. Publ. Bot. XV (1929) 266; Mold., Résumé Geogr. distr. & Syn. (1959) 164, 181, 192, 194, 345 & 391.

S. borneensis Merr. in Journ. Str. Br. Roy. As. Soc. 76 (1917) 114; Mold., Op. Cit. (1959) 193. **Syn. nov.**

S. ferruginea Wight, Ic. Ind. or. IV (1850) 13 t. 1474 (Pro Synonym *S. barbata* Schauer) **nom. nud.**

S. winkleri Hall. f. in Med. 's Rijks. Herb. No. 37 (1918) 86.

Congea barbata Wall. Cat. No. 1738 (1828) 47 & ex Walp., Rep. IV (1844 & 48) 117.

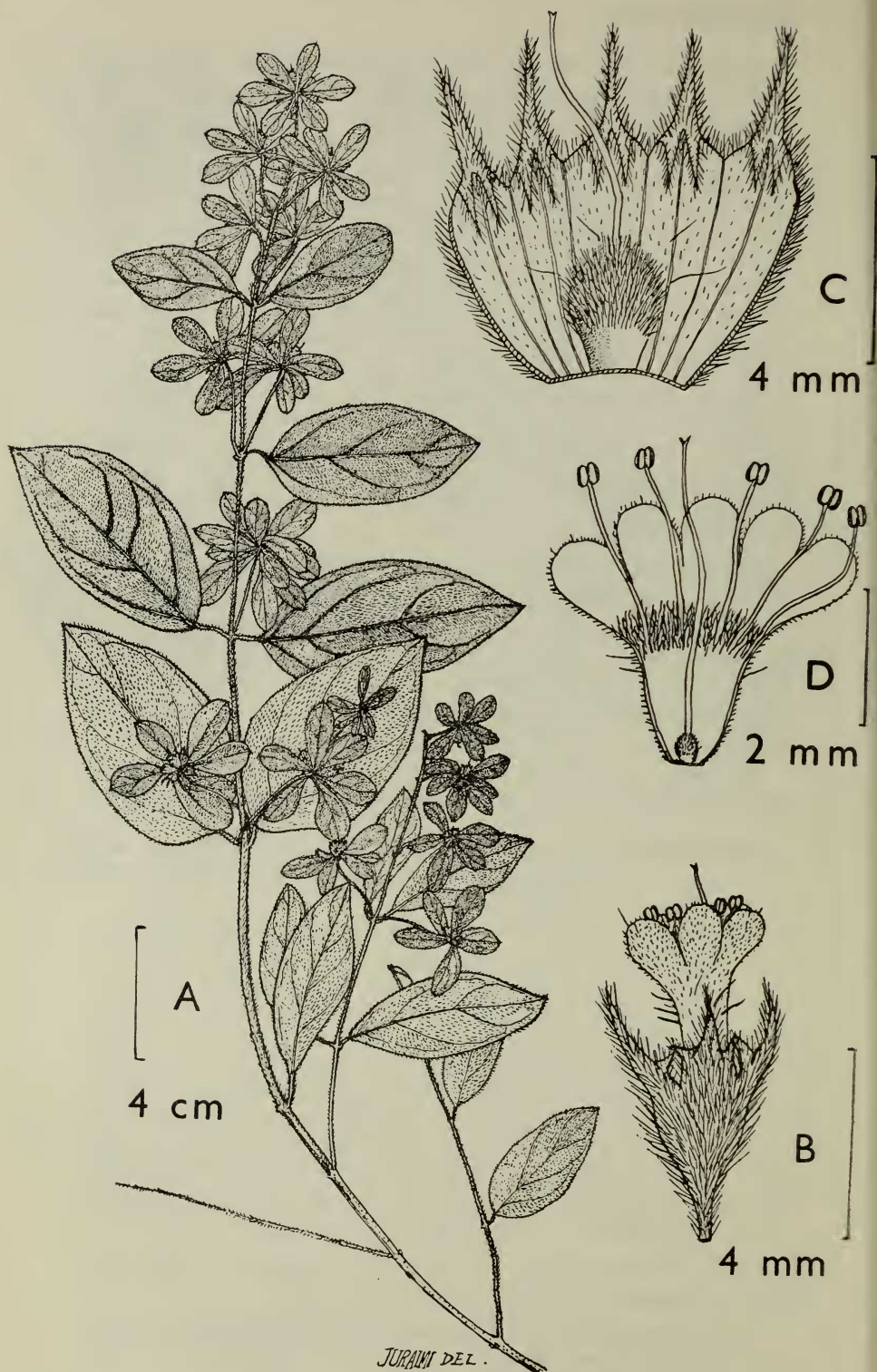


Plate 8. *Sphenodesme racemosa* (Presl) Mold. (Rostado s.n. in Sing.).

A, Inflorescence with leaves. B, Flower. C, Calyx cut open to show ovary. D, Corolla longitudinally cut open.

Viticastrum racemosum Presl, Bot. Bemerk. (1844) 148; Walp. Rep. VI (1846-47) 691: **Basionym.**

TYPE SPECIMEN: ? Malacca (Griffith).

Among the species having 7-flowered cymes, ferruginous hairy leaves, branchlets & inflorescence and exsert stamens and style, *S. racemosa* is easily distinguished by its calyx having bipartite, inflexed lobes and distinctly, often longer, accessory teeth; by its corolla-lobes being externally pubescent and ovary setose in the upper half and glabrous in the lower.

(Var. *racemosa* has the following special characters; Calyx densely ferruginous hirsute without, puberulent within; corolla with broad villous band in the throat).

Branchlets dark brown, somewhat quadrangular, lenticellate, densely rufous hirsute. *Leaves* chartaceous, elliptic-oblong to elliptic-ovate, acuminate, obtuse or mucronate at apex, cuneate or somewhat rounded at base, sparsely tawny villous above when young, later nitid glabrous except on the nerves, densely ferruginous-tomentose beneath, 4-11.5 cm. long, 2-4.5 cm. broad; lateral nerves 5-6 pairs, densely hairy; petiole 3-8 mm. long, hairy. *Inflorescence* terminal and axillary, ferruginous tomentose; panicles variable in length, usually 10-25 cm. long or more; cymes 7-flowered; peduncles 2-3.5 cm. long, densely covered with ferruginous tomentum; involucre bracts 1.5-2 cm. long, 3-8 mm. broad, obovoid-spathulate, distinctly nerved. *Calyx* 5-lobed and with 5-accessory teeth, campanulate, about 4 mm. long, 10-ribbed densely ferruginous-hirsute without, puberulent within; lobes deeply bi-partite, inflexed, hirsute; accessory teeth conspicuous linear-caudate opposite to calyx lobes, reflexed, hirsute. *Corolla* 5-lobed, infundibuliform; lobes oblong-spathulate, externally puberulous, glabrous within; tube cylindric, sparsely puberulous outside; internally glabrous except the villous throat. *Stamens* 5, exsert; filaments slender, glabrous; anther lobes almost oblong. *Ovary* rounded, setose in the upper half, glabrous in the lower; style slender, exsert; stigma bi-lobed. *Fruit* capsular, included.

MALAYA: **Penang**, Tulloh Bahang (Curtis s.n.: CAL & SING); Hills (Porter sub Wall. Cat. 1,738: BM; K, Holotype of *Congea barbata*). **Province Wellesley**, Krian (Ridley s.n.: SING). **Kelantan**, Kemahang (Sow & Motan 94,509: KEP & L). **Trengganu**, Bundi (Rostado s.n.: SING). **Pahang**, Ulu Sungei, Kuantan (Symington & Kiah 28,777: KEP & SING); Raub (Mat Abu 69,625: KEP; Burkill & Haniff 16,922: SING); Bentong (Kostermans 78,672: KEP); Pekan (Ridley 2,159: BM & SING). **Negri Sembilan**, Gunong Berumbun (Alvins 2,010: SING); Tampin (Burkill 3,221: SING; Nur s.n.: CAL). Malacca, Merlimau (Derry 179: BM & SING); Selandar (Burkill 531: SING); loc. incert. (Alvins 957 & 1,745: SING; Harvey s.n.: SING; Griffith s.n.: BM, isotype of *V. racemosum* ?). **Johore**, Kluang (Holttum 9,410: A & SING); Serom (Ridley s.n.: SING); Muar, Biawak (Curtis s.n.: SING).

BORNEO: **Kalimantan**, South East Hayup (Winkler 2,314: L, Holotype of *S. winkleri*; BM & SING); East Kutai (Kostermans 7,239: SING). **Sarawak**, loc. incert. (Bur. Sc. No. 1,847: PNH, Holotype of *S. borneensis*, & K; Foxworthy 450: PNH, Paratype of *S. borneensis*; Haviland s.n.: BM); Matang (Beccari 1,601: L).

SUMATRA: **Lingga Arch.**, Pulau Redjai (Bunnemeijer 7,634: L).

It seems obvious that the type of *V. racemosum* Presl was not Porter's specimen distributed by Wallich as *Congea barbata*, for Presl would not have ignored the specific epithet in Wallich's binomial. Griffith, who was an early collector in Malacca (1841–1845) corresponded with Martius & obviously the specimen quoted by Schauer from Martius herb. was Griffith's, part or duplicate of which must have been studied by Presl. In view of this it is to be presumed that Griffith's specimen in British Museum is the isotype of the species.

Moldenke who made the combination based on *V. racemosum* Presl, did not give any clue about the location or characters of the holotype. From the citation the sole reason for the combination seems to be to respect the priority of Presl's specific epithet, while Schauer and others had followed the old rule and given *Congea barbata* Wall. Cat. No. 1,738 (1828) (Porter's specimen), priority over other names subsequently published.

Though there are some discrepancies in the description of *S. borneensis* and *S. racemosa*, there seems to be no material difference between the species, and so I have treated these two as conspecific. Merrill in his protolog of *S. borneensis* regards this as having 5-flowered cymes, but both in the holotype and the paratype specimens the cymes are generally 7-flowered, 5-flowered cymes being rare and found in the younger or under-developed cymes only.

When Lam (op. cit. 1919 & 121) stated in the keys that the calyx of this species was "without horn-like teeth", he had probably in mind the "teeth" (episepals) sometimes found in each of the sinuses between sepals; for, the accessory teeth (episepals) here are well developed, setose & sepal-like, but seated outside, opposite to each of the inflexed bifid calyx-lobe.

7a. **Sphenodesme racemosa** (Presl) Mold. var. **sabahensis** Munir var. nov. Plate 9.

TYPE SPECIMEN: Tawao, Borneo (Elmer 20,838 – SING).

A forma typica (var. *racemosa*) calyce utrinque pilis densissime appresso, in corollae fauce annulo villosa valde angustiore haec varietas facile distinguenda.

This differs from the type variety by its calyx being provided on both sides with densely appressed hairs and the corolla with a much narrower villous ring in the throat.

BORNEO: **Sabah**, Tawao, Elphinstone Province (Elmer 20,838: A, C, BM, BRI, L & PNH: isotypes; SING – Holotype).

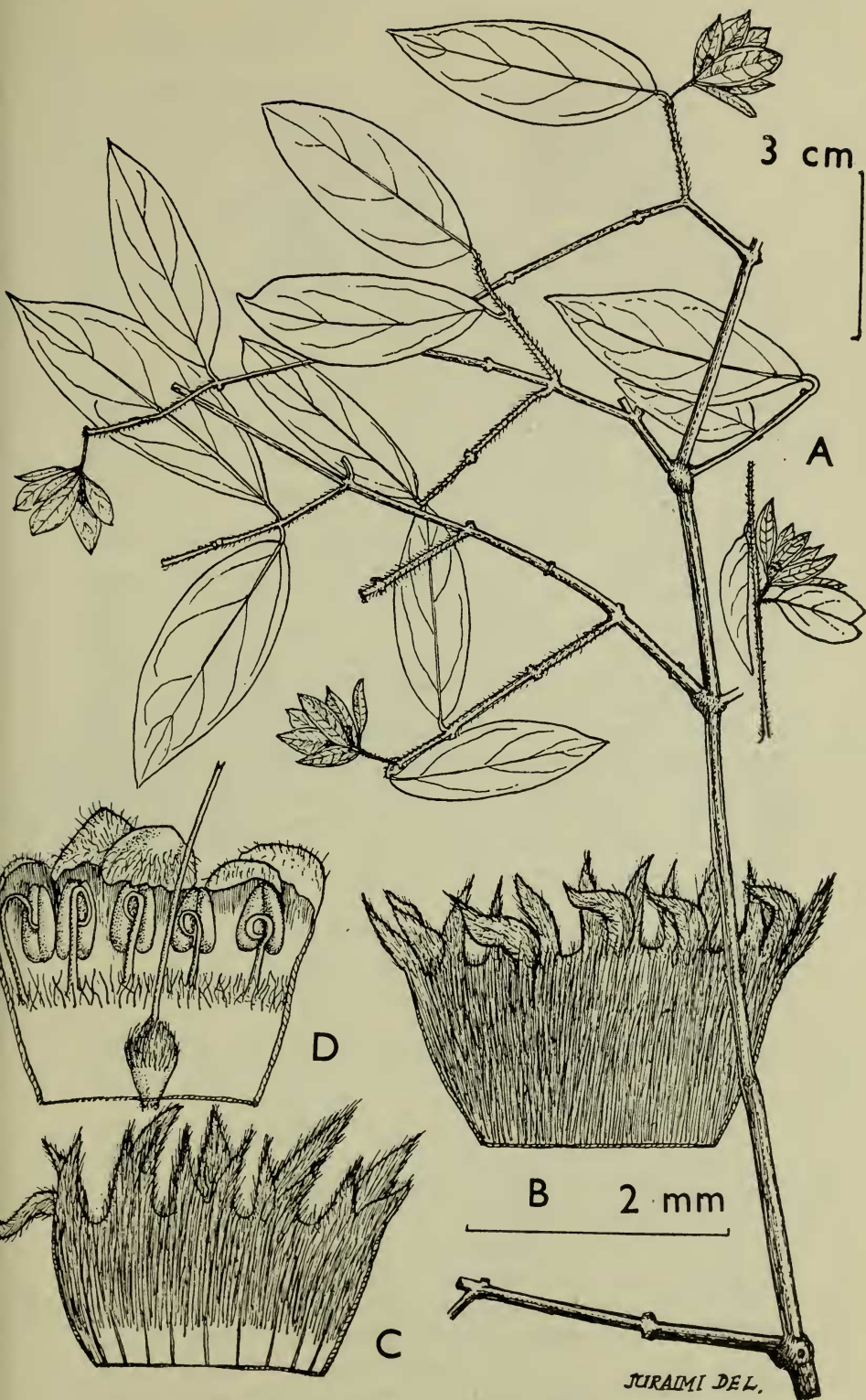


Plate 9. *S. racemosa* var. *sabahensis* Munir (Elmer 20,838 in Sing.).

A, Fertile twig. B, Calyx cut open to show its external structure. C, Calyx cut open to show the internal structure. D, Corolla (in bud) longitudinally opened to show stamens and ovary.

8. **Sphenodesme mekongensis** Dop in Bull. Soc. Bot. France LXI. (1914) 318 & Fl. gén. Indoch. (1936) 901; Fletcher in Kew Bull. (1938) 442; Mold., Résumé Geogr. distr. & Syn. (1959) 176 & 178. **Plate 10.**

TYPE SPECIMEN: Xang Kay, Laos (Thorel s.n. - P).

From *S. triflora* to which it is closely allied in its 3-flowered cymes, this differs in its leaves being fewer nerved (2-3 pairs), involucre bracts being glabrous, calyx-tube glabrous and provided with accessory teeth, corolla-throat densely villous and ovary setulose except at the base.

Branchlets brownish, rugose, lenticellate, glabrous. *Leaves* elliptic-ovate to lanceolate, obscurely acuminate at apex, somewhat cuneate towards base, glabrous, papyraceous, nitid above, dull below, 5-12.5 cm. long, upto 3.8 cm. broad; main lateral nerves usually 1 pair, sometimes 2 pairs, the middle one ascending almost parallel to the margins, the outermost ones frequently looping with the tertiary veinlets; secondary veins short, straight, sometimes split at apex; reticulation distinct on the underside; petiole pubescent, 5-8 mm. long. *Inflorescence* axillary and terminal, lax, pubescent when young, upto 20 cm. long; cymes 3-flowered, peduncle slender, 6-12 mm. long; involucre bracts oblong-spathulate, narrowed towards base, membranous, glabrous, distinctly reticulate, 12-18 mm. long, 4-8 mm. broad, two bracts longer than the others. *Calyx* campanulate, 5-lobed, 10-ribbed, 4-5 mm. long; tube pubescent without, glabrous within; lobes entire, $\pm$ triangular, pubescent on both sides; accessory teeth small, alternating with the lobes. *Corolla* 5-lobed, glabrous without, densely villous in the throat, slightly longer than the calyx; lobes ciliate at margin. *Stamens* 5, exsert. *Ovary* ovoid, setulose, except at the base; style exsert, stigma faintly bilobed.

LAOS: Xang Kay [by the Mekong River] (Thorel s.n.: A, Isotype).

THAILAND: Puk Sana Vien-Chan (Kerr 20,720: E); Pu Tong (Kerr 8,825: E); Lampang, Me Sui (Winit 1,961: E).

9. **Sphenodesme pierrei** Dop in Bull. Soc. Bot. France LXI, (1914) 317 & in Fl. gén. Indoch. (1936) 906; Mold., Résumé Geogr. distr. & Syn. (1959) 176. **Plate 11.**

TYPE SPECIMEN: Cochinchine, Vietnam (Pierre s.n. & No. 70 - P).

This species is closely allied to *S. pentandra*, but is easily distinguished by its leaves being fewer nerved (2-3 each side), peduncle and calyx densely hirsute and involucre bracts broadly elliptic-obovate, ciliate towards the base.

Branchlets reddish brown, almost quadrangular, hairy at first, later glabrous, lenticellate. *Leaves* elliptic-oblong, glabrous, acuminate to obscurely mucronate towards apex, $\pm$ rounded at base, nitid above, dull below, 8-11 cm. long, 4-4.5 cm. broad; lateral nerves prominent beneath, 2 lowermost pairs long and opposite,

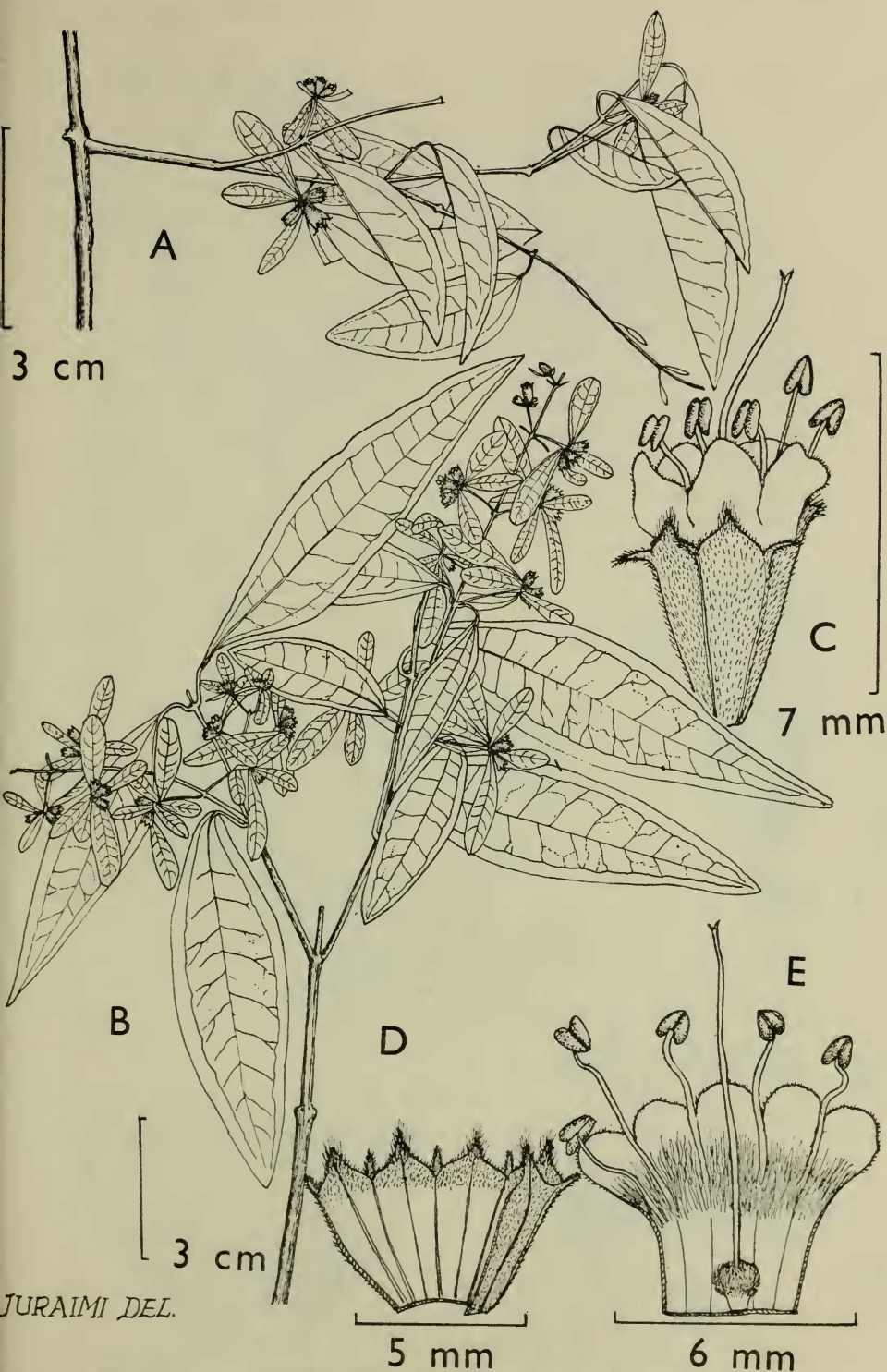


Plate 10. *Sphenodesme mekongensis* Dop (A Thorel s.n. in Arn. Arboretum; B-E Kerr 20,720 in Edin.).

A & B, Parts of inflorescence. C, Flower. D, Calyx cut open to show its ribs and glabrous tube. E, Corolla longitudinally opened to show stamens and ovary.

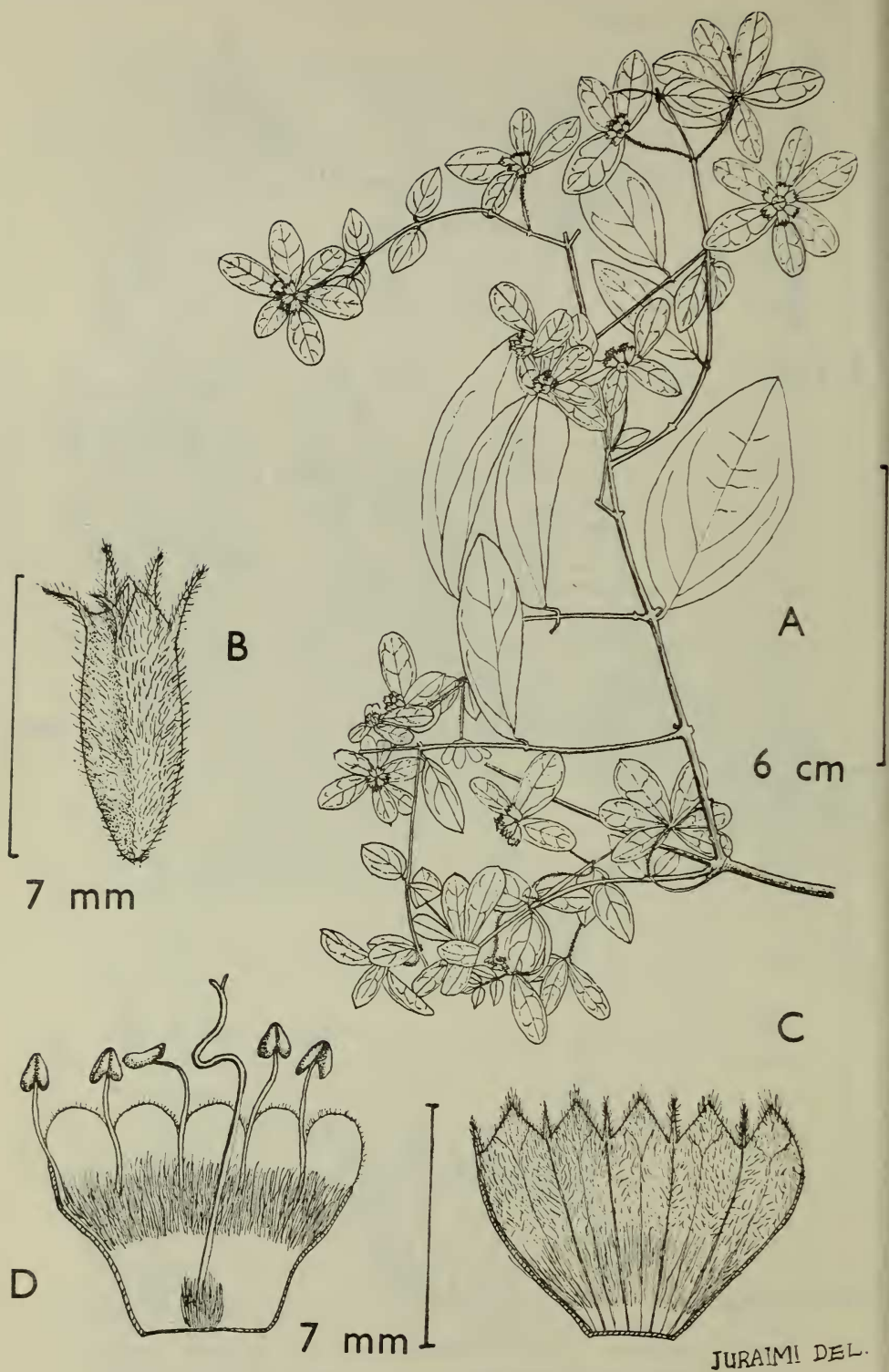


Plate 11. *Sphenodesme pierrei* Dop (Pierre s.n. in Arn. Arboretum).
 A, Fertile twig. B, Calyx. C, Calyx longitudinally cut open. D,
 Corolla cut open.

the other 2-4 pairs very short, alternate, horizontal; secondary veins short, transverse, nearly parallel, reticulation distinct; petiole thickly puberulent, 3-4 mm. long. *Inflorescence* axillary and terminal panicles, lax, pubescent, 15-18 cm. long, 5-7 cm. through; bracts ovate, leaf-like, pubescent, 15-20 mm. long, 8-12 mm. broad; cymes 7-flowered; peduncle pubescent, slender, 12-18 mm. long; involucre bracts subequal, elliptic-obovate, obscurely mucronate at apex, narrowed towards base, glabrous in the upper part, hairy at base, ciliate in margin with distinct reticulation, 17-25 mm. long, 8-12 mm. broad. *Calyx* with 5 lobes and 5 accessory teeth, hirsute without, hispidly tomentose within; tube 6 mm. long; lobes almost triangular, acute, 2 mm. long; accessory teeth situated in the sinuses between the lobes, ciliate, reflexed (recurved), as long as the lobes or longer. *Corolla* narrow, funnel-shaped, glabrous without, inside densely villous in the throat, otherwise glabrous, 8-9 mm. long, lobes equal, glabrous, fimbriate in the margin. *Stamens* 5, exsert, filaments slender, 4 mm. long. *Ovary* ovoid, setose; style exsert, 7 mm. long; stigma shortly 2-lobed.

VIETNAM: **Cochinchine**, Ti-tinh (Pierre s.n.: A & K, syntypes).

Of the three syntypes quoted by Dop. two were collected by Pierre in Vietnam, while the third was collected by Harmond in Laos.

10. **Sphenodesme pentandra** Jack in Malay. Misc. I (1820) 19; ed. Wallich in Hook., Bot. Misc. I (1830) 285; Clarke in Hook. f., Fl. Br. Ind. IV (1885) 602 sensu typico; Forbes & Hemsley, in Journ. Linn. Soc. XXVI (1890) 265; Briq. in Engl. & Prantl, Nat. Pflanzenfam. IV 3a (1897) 181; King & Gamb. in Journ. As. Soc. Beng. LXXIV, 4 (1909) 863; Craib in Kew Bull. (1911) 445; Lam, Malay. Verb. (1919) 335 & in Bull. Jard. Bot. Buitz. (1921) 99; Merr., Bibl. En. Born. pl. (1921) 518; Ridl., Fl. Mal. Pen. (1923) 639; Dop in Fl. gén. Indoch. IV (1936) 904; Fletcher in Kew Bull. (1938) 442; Kanjilal & Das in De, Fl. Assam (1939) 496; Mold., Résumé Geogr. distr. & Syn. (1959) 345, var. **pentandra**. **Plate 12.**

S. acuminata Wight, Ic. Ind. Or. IV, 3 (1850) 14 t. 1476 (pro synonym *S. jackiana* Schauer)).

S. jackiana (Wall.) Schauer in DC. Prodr. XI (1847) 622; Miq., Fl. Ind. Bot. II (1858) 909; Clarke in Flora of Koh Chang VIII (1904) 174; Dop in Bull. Soc. Bot. France 61 (1914) 319; Mold. op. cit. p. 345.

S. jackiana (Wall.) Wight t. 1477, quoad nomen tantum, (excl. Icon. et description = *S. griffithiana* Wight).

S. pentandra Griff., Notul. IV (1854) 181, non *S. pentandra* (Roxb.) Griff. op. cit. 176.

Gongea jackiana Wall. Cat. No. 1735 (1828), & in Hook., Bot. Misc. I (1830) 285 in observ.; Walp., Bot. IV (1848) 117. **isonym.**

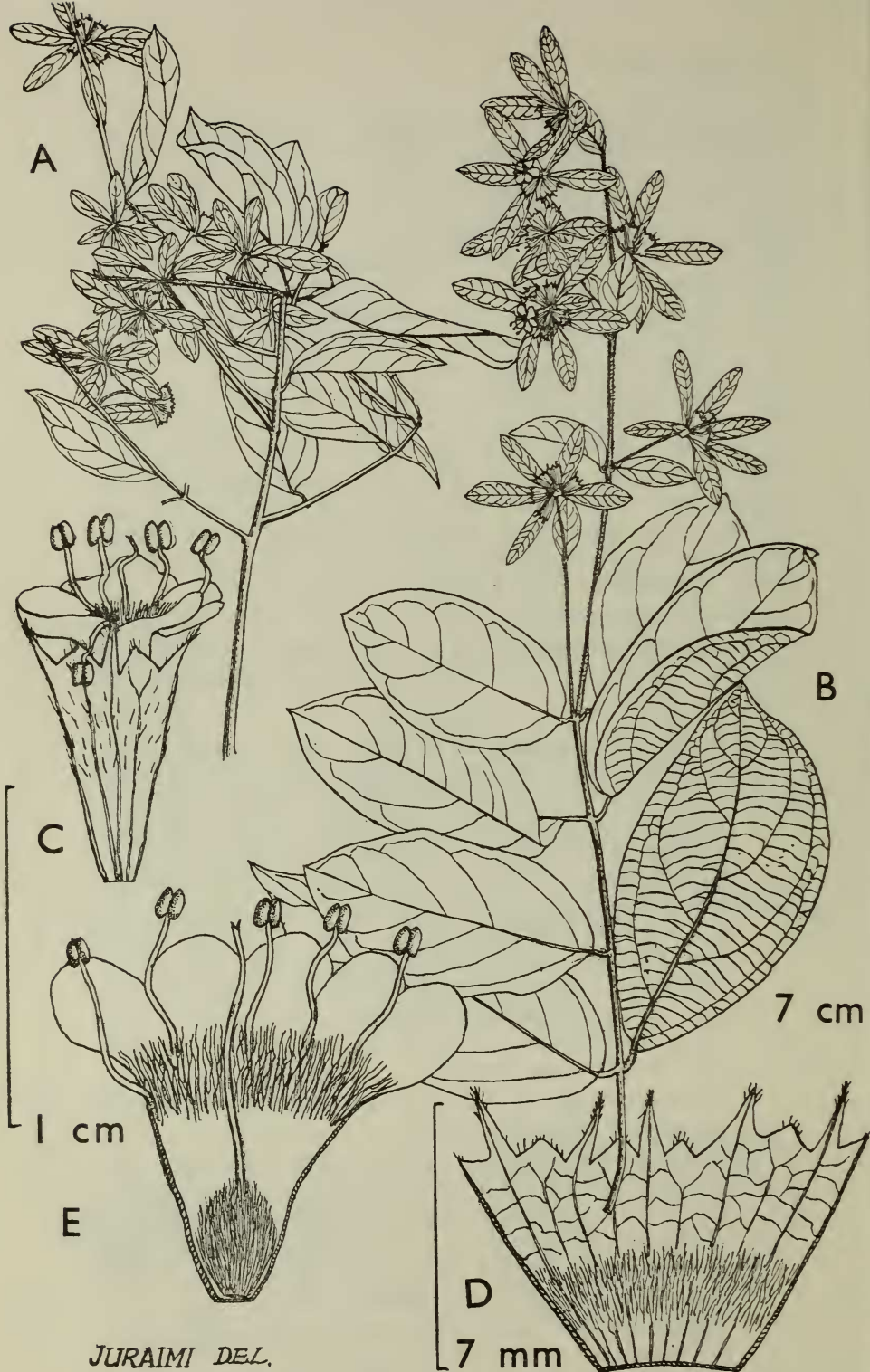


Plate 12. *Sphenodesme pentandra* Jack (A Jack s.n. in Edin.; B-E Wall. Cat. No. 1735 in Leiden).

A & B, Parts of inflorescence. C, Flower. D, Calyx longitudinally cut open to show the accessory teeth. E, Corolla vertically cut open.

Symphorema jackianum Kurz, For. Fl. Burma II (1877) 255.
p.p.

TYPE SPECIMEN: Penang, Malaya (Jack s.n. - E).

Among the 7-flowered species of the sub-section *Sphenodesme* this taxon is readily distinguished by its leaves being glabrous and 4-6 veined on each side, and peduncles, involucre bracts and outside of the calyx being glabrous.

Branchlets dark brown, obscurely quadrangular, puberulous when young, later glabrous, lenticellate. *Leaves* chartaceous or sub-coriaceous, elliptic-oblong to lanceolate-oblong, acuminate-acute, often mucronulate at apex, cuneate or subrotundate at base, glabrous on both sides, nitid above, dull below, 5-18 cm. long, 3-7 cm. broad; midrib and axils of veins somewhat hairy beneath; lateral nerves 4-6 pairs; petiole 5-15 mm. long, pubescent when young, longitudinally channelled, curved. *Inflorescence* axillary and terminal, puberulous; panicles 15-37.5 cm. long, pubescent in the rachis when young, later glabrous, ciliated on the nodes; cymes 7-flowered; peduncle 1.5-3 cm. long; involucre bracts oblong-spathulate, obtuse, glabrous, 1.5-2.8 cm. long, 5-10 mm. broad. *Calyx* with 5-lobes and 5-accessory teeth, campanulate, 4-7 mm. long, 10-ribbed, sparsely hairy without, glabrous within, except for a thin band of appressed hairs towards base, conspicuously reticulate in upper part of the tube; lobes small, aristate; accessory teeth conspicuous, acuminate, aristate. *Corolla* 5-lobed, tubular or funnel shaped; lobes somewhat rounded, glabrous, spreading; tube about 5 mm. long, glabrous without, densely villous within the upper third (throat), glabrous in the lower. *Stamens* 5, exsert; filaments slender; anther lobes oblong. *Ovary* densely setose, glandular; style long, exsert, slender, about 5 mm. long; stigma shortly bifid. *Fruit* about 4 mm. long, globular, setose.

THAILAND: Terutao (Curtis=2,522: SING); Satul, Adang, Kuan po, alt. 20 m. (Kerr 13,828 & 14,070: E); Ranawng, Kao Talu, Kraburi (Kerr 16,376 & 16,535: C & E); Surat, Chumpawn, Ta Ngaw, Kaw Samui alt. 50-200 m. (Kerr 11,603, 12,583: E & 11,816: C & E); Nakawn, Tai, Sritamarat, alt. 50-200 m. (Kerr 15,396 & 5,849: E); Tongkah (Curtis s.n.: SING); Pungah (Curtis s.n.: SING); Krabin, Bupram, alt. 300 m. (Kerr 9,832: E); Bangtaphanoi (Keith 155: SING); Wat Soa Uhm (Seidenfaden 2,182: C & SING); Tassateng (Seidenfaden 2,129: C & SING); Kao Sabah, Chantaburi (Seidenfaden 2,670: C & SING); Chanburi Pong, Namrawn (Sangkachand 581: A & BKF); Kaw Suau (Annandale s.n.: SING); Trat, Koh Chang (Smitinand 2,200: A); Kott Nam Ka Island (Vaughan 306; CAL & L); Khao Rum (? 607: E); Sriracha (Collin 495, 632, 1,388, 1,416 & 1,969: E Marcan 1,204: BM & E); Koh Chick (Schmidt 863: C); Phu Kok (Pierre s.n.: BM); loc. incert. (Fielberg in April 1869: C).

MALAYA: **Kedah**, Langkawi, Coah (Curtis 2,522: SING; Ridley & Curtis 8,320: SING; Haniff 15,478: SING; Haniff & Nur 7,070: A & SING; Fox s.n.: SING); Ulu Malacca (Dolman 21,493: SING). **Penang**, loc. incert. (Jack s.n.: E, holotype; Wallich sub. Wall. Cat. No. 1,735: BM, E, K, L and 1,735/1: BM); Telok Bahang (Curtis 269: SING); Province Wellesley, Krian (Ridley 9,391: BM & SING). **Trengganu**, Bukit Kajang (Corner s.n.: SING). **Perak**, Grik (Burkill & Haniff 12,524: SING). Gopeng (Kunstler 4,532: CAL). **Pahang**, Sungei Kechau (Walker 23,324: SING); Raub (Kalong 20,325: SING); Kuala Tahan (Seimund 14 & 275: SING); Kuala Tembling (Ridley 2,160: BM & SING). **Selangor**, Ulu Gombak (Murdoch 151: BM); Sentul (Ridley 14,937: BM & SING). **Negri Sembilan**, Sungei Ujong, Burunang (Alvins 3,304: SING). **Malacca**, Brisu (Derry 40: BM & SING); Bukit Panchur (Holmberg 825: SING); loc. incert. (Alvins 2,138: SING; Maingay sub Kew distr. No. 1,195: A & L; Griffith s.n.: DD). **Johore**, Bukit Saga (Ridley 11,122: SING); Kota Tinggi (Sinclair 40,690: E, L, KEP & SING). **Singapore**, Changi (Ridley 2,793: BM & SING); Seletar (Ridley 14,187: BM & SING); loc. incert. (Hullett 520: SING).

BORNEO: **Sabah**, Sandakan (Cuadra A1, 152: KEP, PNH & SING). **Kalimantan**, Sangkulirang, Karangan river (Kostermans 13,542: SING).

LAOS: Arboretum de Trang-bon (Poilane s.n.: A); Between Strung-treng (Poilane 16,264: A).

VIETNAM: **Annam**, Nhatrang (Alleizette s.n.: L); Bord du Selampho (Harmond s.n.: A); loc. incert. (Poilane 5,630: A). **Cochin-Chine**, Saigon, Thu Dau Moi (Thorel 649: A & SING); Bien Hoa (Pierre 70: A, SING & 1,095: A, L & SING).

The typification of the species is discussed in the introduction. As to the mis-application of *S. pentandra* Jack, see the var. *wallichiana* below.

10a. **Sphenodesme pentandra** Jack var. **wallichiana** (Schauer) Munir stat. nov.

S. pentandra Jack: sensu Clarke in Hook. f., Fl. Br. Ind. IV (1885) 602; King & Gamb. in Journ. As. Soc. Beng. LXXIV, 4 (1909) 863; Craib in Kew Bull. (1911) 445; Dop in Bull. Soc. Bot. France 61 (1914) 319; Lam, Malay. Verb. (1919) 335 & in Bull. Jard. Bot. Buitz. (1921) 99; Merr., Bibl. En. Born. pl. (1921) 518; Ridl., Fl. Mal. Pen. (1923) 639; Dop in Fl. Gén. Indoch. IV (1936) 904; Fletcher in Kew Bull. (1938) 442; Kanjilal & Das in De, Fl. Assam (1939) 496; Mold., Résumé Geogr. distr. & Syn. (1959) 345. **Plate 13.**

S. pentandra (Roxb.) Griff., Notul. IV (1854) 176 sub *Decadontia coerulescens* in observ.

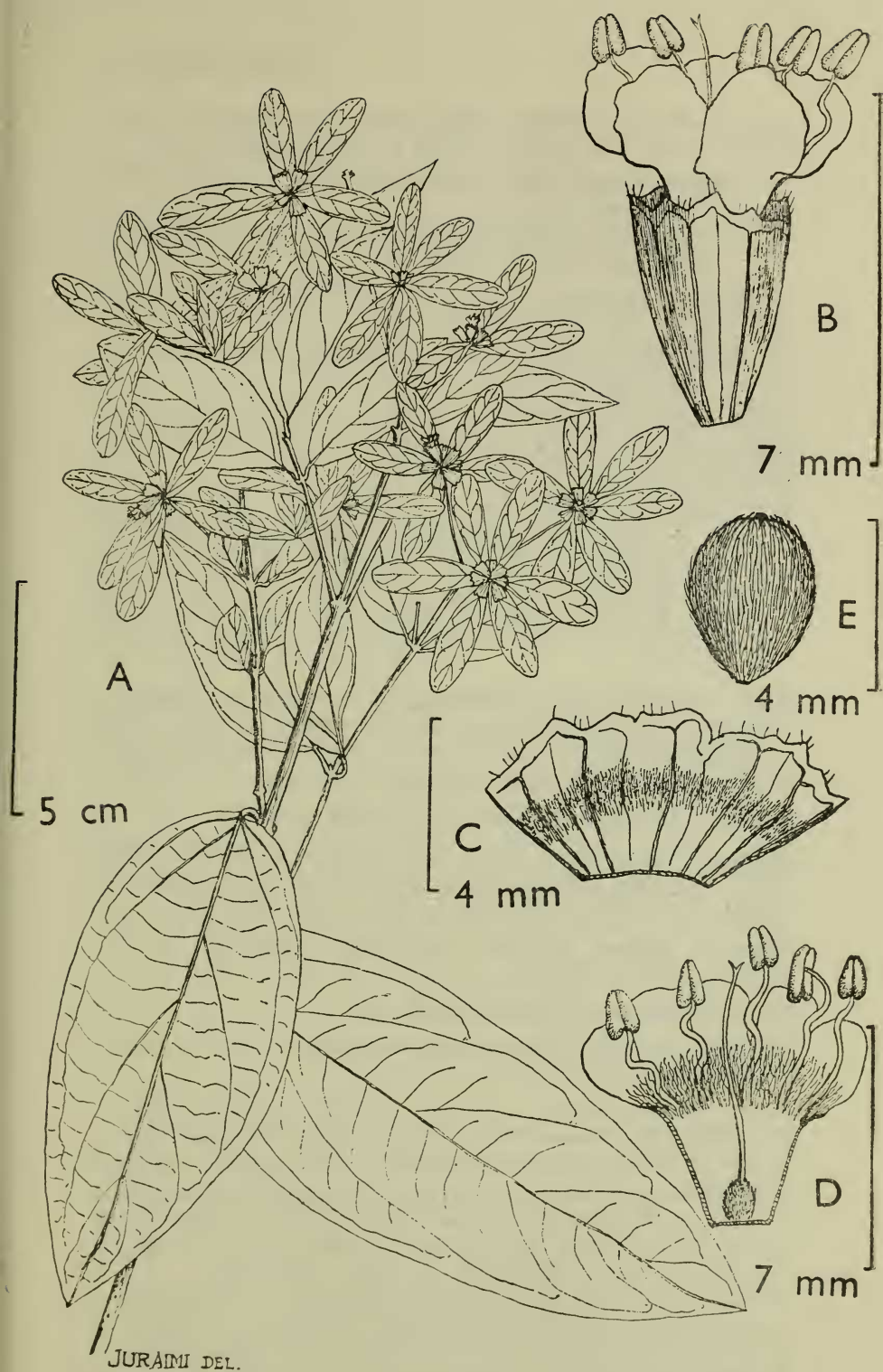


Plate 13. *S. pentandra* var. *wallichiana* (Schauer) Munir (Wall. Cat. No. 1,734 in Br. Museum).

A, Portion of an inflorescence. B, Flower. C, Calyx cut open to show the nature of accessory teeth. D, Corolla longitudinally cut open. E, Fruit.

S. wallichiana Schauer in DC. Prodr. XI (1847) 622; Wight, Ic. Ind. Or. IV, 3 (1850) 14 t. 1475. **Basionym.**

Congea jackiana Wall. var. *attenuata* Wall., Cat. No. 1735/2 (1828) nomen.

Congea pentandra (Roxb.) Wall. Cat. No. 1734 (1828) nomen; Walp., Rep. Bot. IV (1848) 117.

Roscoeia pentandra Roxb., Cat. Hort. Bot. (1814) 46 nomen, & Fl. Ind. III (1832) 54.

TYPE SPECIMEN: Sylhet, E. Pakistan (Wallich Cat. No. 1,734 in herb. DC).

This variety differs from the type form, in its calyx being shortly lobed or almost truncate at apex, glabrous without, and accessory teeth being minute even after anthesis.

EAST PAKISTAN: **Sylhet**, Pandua (De Silva sub Wall. Cat. No. 1,734: A, BM, E. & L, isotypes of *S. wallichiana* Schauer); loc. incert. (Roxburgh 1823: BM, holotype of *Roscoeia pentandra* Roxb.); cult. Hort. Bot. Calcutta (Wall. Cat. No. 1,735/2 [from Sylhet]: BM; Gower s.n.: E; Wight s.n.: E; Leg. ? s.n.: DD, E & L); Cult. Hort. Bot. Serampore (Voigt 2,911, 1,674, 2,115 & s.n.: C).

INDIA: **Assam**, Khasia Mountains 1,000–1,200 m. (Alleizette 5,722: L; Griffith sub Kew distr. No. 6,009: A, BM & C); Mongsendi Road (Watt 11,811: CAL & E); Tounghoo distr. (McLelland s.n.: E); Manipur (Watt 6,731: E).

NICOBARS: Glathea (Kamphovener 2,020 & 2,025: C).

BURMA: Lonton (Lace 5,165: E); Bhamo, alt. 100 m. (Cubitt 354: E); **Shan State**, Kengtung, alt. 1,000 m. (MacGregor 700: CAL & C, 2,516: E); Myitkynia (Mya 2,297: DD).

MALAYA: **Pahang**, Kuantan, Ulu Sungei (Symington & Kiah 28,773: KEP & SING).

LAOS: **a-ninh-xa-ne** (Poilane 13,680: A).

VIETNAM: **Annam**, Quang-tri (Poilane 1,209: A & B); loc. incert. (Pierre 116: B).

CHINA: **Hunan**, Taping, alt. 500–700 m. (Forrest 9,837 & 13,617: A, BM & E); **Hainan**, Ching Mai, Shan Pak Tang (Lei 439: A, B, L & SING); Kan-en, Fong Ngau Po (Lau 5,416: A); Sam Mo Watt (Lau 3,439: A); Chang-Kiang, Lok Mooi Shan (Lau 1,213: A & BM); Tam Chau-Lam Ko, Lin Fa Shan (Tsang 308: A, B, BM, E & L) Po-ting, Lingshin (Liang 61,598: A & B); loc. incert. (Ford 420: L; Liang 65,082: A).

What seems to be an anomalous distribution of this variety is the specimen from the State of Pahang in Malaya; but Dop (1914 p. 320) had examined in Paris Herbarium a specimen collected by Ridley in Pahang, as well as specimens from Thailand (leg. Kerr) & Moulmein, the last two regions not represented by the specimens examined by me.

Though Schauer had quoted *Roscoea pentandra* Roxb. as a synonym of *S. wallichiana*, it is obvious from his indications that he had seen only Pandua (Pundua) specimen represented by Wallich's Cat. 1,734 from De Candolle's herbarium on which he had based his diagnosis. Hence this should be regarded as the holotype and its duplicates isotypes.

Roxburgh's species was represented by two kinds of specimens. One directly collected in Sylhet and described in the Flora and preserved in the British Museum, and the other represented by a plant grown in Botanic Gardens, Calcutta, and referred in Roxb., Hort. Bot. Beng. (1814). Though both represent the same taxon, Wallich had referred the Calcutta specimen as *Congea jackiana* Wall. var. *attenuata* (Wall. Cat. 1,735/2), retaining the Sylhet specimen under *Congea* (*Roscoea*) *pentandra* (Roxb.) Wall. Cat. 1,734. A specimen of the Calcutta plant was drawn by Wight t. 1475 (1850) and subsequently specimens of the plant have been distributed. There is no doubt that this is identical with *R. pentandra* Roxb. (= *S. wallichiana* Schauer = *S. pentandra* Jack var. *wallichiana* (Schauer) Munir).

Griffith's specimens distributed from Kew under No. 6,009, bear a label stating that these are from Griffith's collection made in Burma and Malaya; but a presentative of the same collection in Hance's Herbarium, preserved in the British Museum, is recorded as having come from "Montibus Khasianis" (Khasia Mountains). Since this information appears to be correct, I have referred to Khasia Mts. the duplicates from Arnold Arboretum and Copenhagen. As no field notes have been entered in this Griffith's sheet, it was not possible to decide whether this specimen represents a duplicate of Griffith's No. 1,353, collected at Onswye on the Khasia Mountains and named by him as *Congea* sp. in *Notulae* II, 1848 p. 91, and identified by Clarke (Fl. Br. Ind. IV, 1885 p. 601) as *S. unguiculata*. On the other hand the latter species (= *S. involucrata*) has not been represented by any of Griffith's collection available to me.

Dop (Bull. Soc. Bot. France, 61, 1914 p. 319) recognised the difference between the two taxa but unfortunately he took *S. pentandra* Jack as if based on *Roscoea pentandra* Roxb. and later in Fl. Gén. Indoch. IV, 1936, united the two taxa as one. In addition he seems to have been confused (1914) over Wight Ic. t. 1476 which is Jack's species, but which he identified as *Roscoea pentandra* Roxb. (= *S. pentandra* Jack var. *wallichiana*).

Griffith described two species under *S. pentandra*. One was a combination based on *Roscoea pentandra* Roxb. and the other was a new species based on a specimen collected by him from Khasia Mountains (= *S. griffithiana*).

Sub-sectio **Pentadontia** Munir **sub-sectio nov.**

Calyx 5-nervata, lobis integris 5, episepalibus carentibus.

Calyx 5-ribbed, with 5 entire lobes and no accessory teeth.

TYPE: *S. triflora* Wight.

11. **Sphenodesme thorelii** Dop in Bull. Soc. Bot. France LXI, (1914) 318 & in Fl. gén. Indoch. (1936) 902; Mold., Résumé Geogr. distr. & Syn. (1959) 177.

S. thorelii var. *cordifolia* Dop in Bull. Soc. Bot. France 61 (1914) 317 & in Fl. Gén. Indoch. (1936) 903; Mold., op. cit. (1959) 177 (as var. *cordata*) **Syn. nov. Plate 14.**

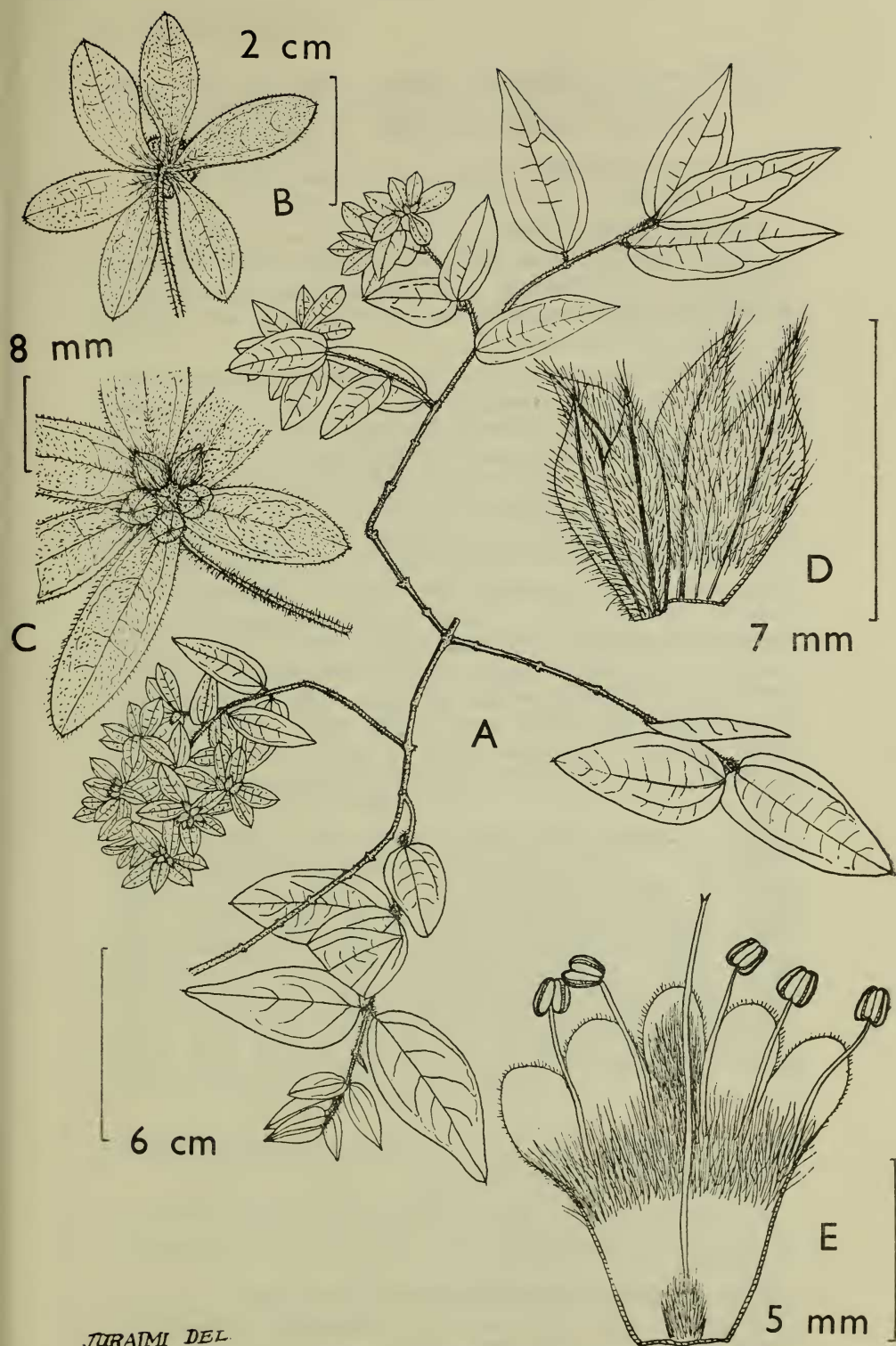
TYPE SPECIMEN: Cochinchine, Vietnam (Thorel 1,385 – P).

Of the three taxa with 5-flowered cymes, *S. thorelii* is readily distinguished by its panicles being congested and hirsute, leaves $\pm$ cordulate at the base, calyx hirsute and mid corolla-lobe slightly longer and villous towards base.

Branchlets brown, lenticellate, hirsutely fulvo-pubescent when young, later glabrous. *Leaves* ovate-oblong or lanceolate, mucronate at apex, somewhat cordulate at base, coriaceous, nitid and glabrous on both sides except the pilosity on the middle and primary nerves, 5–8 cm. long, 2–3.5 cm. broad; primary nerves 1–2 pairs, oblique and curved upto the middle of the lamina; secondary nerves upto 10 pairs, spreading almost at right angle with midrib; reticulation not distinct; petiole hirsute, 3–4 mm. long. *Inflorescence* axillary and terminal; panicles congested, densely hirsute, bearded at the nodes, 10–15 cm. long, 4–5 cm. through; bracts leaf-like, hirsute on both sides, especially on nerves; cymes 5-flowered, congested; peduncle very hirsute, 12–17 mm. long; involucre bracts sub-equal, elliptic-obovate, rounded and mucronulate at apex, attenuate towards base, ciliate in the margins, pilose at base, membranous, 17 mm. long, 7 mm. broad; flower 8 mm. long. *Calyx* with 5 lobes and no accessory teeth, hirsute all over except for a glabrous base within, 5-nerved, 6 mm. long, 4 mm. broad; lobes triangular, acute, erect, about 2 mm. long. *Corolla* infundibuliform, 5-lobed, 8 mm. long; tube glabrous without, densely villous in the throat; lobes sub-equal, rounded at apex, ciliate in the margin; middle one or two lobes slightly longer than others, villous towards base inside. *Stamens* 5, exsert, inserted in the throat, upto 8 mm. long. *Ovary* ovoid, setose; style slender, upto 10 mm.; stigma small, shortly bilobed.

VIETNAM: **Cochinchine**, loc. incert. (Thorel 1,385: A & K, syntypes).

Dop has mentioned three specimens without indicating any holotype, but from the specific epithet it seems that Thorel's 1,385 was intended to be the holotype, the collectors of the other two specimens being different.



JURAIMI DEL.

Plate 14. *Sphenodesme thorelii* Dop (Thorel 1,385 in Arn. Arboretum).
 A, Fertile twig. B, Back view of a cyme. C, Ibid, its front view.
 D, Calyx vertically cut open. E, Corolla longitudinally cut open.

12. *Sphenodesme amethystina* Dop in Bull. Soc. Hist. Nat. Toulouse LXIV (1932) 573 & in Fl. gén. Indoch. V (1936) 901: Mold., Résumé Geogr. distr. & Syn. (1959) 176.

TYPE SPECIMEN: Nhatrang, Vietnam (Poilane 6,830 & 6,895 - P).

From the description this species appears to be a close ally of *S. thorelii* and *S. stellata*, though the author placed it near *S. mekongensis* which belongs to sub-section *Sphenodesme*; but *S. amethystina* is described to have no accessory teeth and so placed in sub-section PENTADONTIA.

Erect or climbing shrub, 2 m. high (Poilane). *Branches* almost quadrangular; younger covered with short, yellowish, branched and star-shaped hairs, afterwards glabrous; bark grey, lenticelled. *Leaves* broadly oval, rounded and cordulate at base, obtuse or suddenly and shortly acute at apex, glabrous, stellate hairy in the nerves and green above when dry, stellately pubescent and paler beneath, chartaceous, almost coriaceous, 10-15 cm. long, 7.5-10 cm. wide; nerves strong, very prominent underneath; secondary nerves 10-12, very prominent under, curved a little towards the margins and united into a quite visible intramarginal nerves; veins almost parallel and reticulations distinct; petiole thick, 7 mm. long. *Inflorescence*: capitulum of 3-4-5-flowered, grouped in a dense, violet terminal panicle, 20-30 cm. long, 10-15 cm. wide; bracts foliate, the smaller ones entirely violet, the larger ones simply arranged. *Involucral bracts* 6, elliptic, rounded at top, narrowed at the base, violet, finely stellately pubescent underneath, 18-22 mm. long, 7-13 mm. wide; peduncles stellately pubescent, 15-20 mm. long; flowers with a blue corolla (Poilane). *Calyx*: obconic, narrow, grows a little and abruptly enlarged in the upper half after anthesis, violet and shortly stellately hairy specially outside; yellow and long silky white hairs inside, 7-8 mm. long; lobes 5, triangular acute, 1 mm. long. *Corolla*: (in the bud) funnel-shaped, glabrous outside, hairy within at the insertion of stamens; lobes 5, equal, round and puberulent outside at the apex. *Stamens* 5, inserted at the throat, exsert; anthers with parallel cells. *Ovary* obovoid, a little flattened at the summit, provided with yellow stellate hairs from the middle above, mixed with simple white, silky hairs; style long, glabrous; stigma shortly bifid. Fruit . . .

VIETNAM: **Annam**, Dai Lanh in Nhatrang province (Poilane 6,830 & 6,895, syntypes, non vidi).

I have not seen the types of the species or their duplicates, nor has any specimen been found agreeing with the specific description given by the author.

Frequently young cymes may bear less than the normal number of flowers to a cyme. The fact that the author found the number of flowers to a cyme varying from 3 to 5 suggests that the panicle itself was young. The author describes corolla in the bud only.

13. **Sphenodesme stellata** Merr. in Univ. Calif. Pub. Bot. XV (1929) 266; Mold., Résumé Geogr. distr. & Syn. (1959) 192. **Plate 15.**

TYPE SPECIMEN: Tawao, Borneo (Elmer 21,631 — PNH (destroyed); UC, isotype (studied by the author)).

Among the species of the sub-section PENTADONTIA which have completely glabrous ovary and exserted stamens and style, *S. stellata* is easily distinguished by its stellately hairy branchlets (described for *S. amethystina*) and 7-flowered cymes (found in *S. triflora* var. *montana*).

Branchlets yellowish-rusty with short plumose-stellate hairs. *Leaves* elliptic-oblong, entire, abruptly and shortly acuminate at apex, cuneate towards base, glabrous above, stellate-tomentose beneath, 9–14 cm. long, 5.5–8 cm. broad; main nerves 5–6 pairs, curved upwards; petiole upto 1 cm. long, stellate-pubescent. *Inflorescence* axillary and terminal (panicles), upto 30 cm. long, stellate-tomentose, yellowish-rusty; cymes 7-flowered, peduncle 1–2 cm. long; involucre bracts 6, oblanceolate to oblong-oblanceolate, narrowed towards base, 3-nerved, reticulate, upto 2.8 by 1 cm., young ones densely stellate-pubescent. *Flowers* sessile; *Calyx* 5-lobed, without accessory teeth, densely stellate-pubescent without and with long, appressed hairs within, nonribbed, ± 4 mm. long. *Corolla* 5-lobed, slightly longer than calyx, puberulent in the lobes outside, glabrous in the tube without, villous in the throat, ± 5 mm. long. Stamens 5, exsert; filaments slender; anther-lobes $\pm$ oblong. *Ovary* glabrous; style filiform; stigma shortly bilobed. *Fruit* ovoid, ± 4 mm. long.

BORNEO: **Sabah**, Tawao (Elmer 21,631: L & K, Isotypes); Sandakan, at Bettotan (Puasa 4,749: L & SING).

Merrill in his protolog of this species states that, "Corollas have all fallen, and these were apparently not observed by the Collector". Hence he failed to describe the stamens and carpel. However, I found a young flower in the isotype preserved in Herb. Leiden, a drawing of which is included here. It is obvious that this species cannot be placed near *S. ferruginea* (Griff.) Briq. of the BRACHYNEMA section which is characterized by included stamens and style; which are exsert in *S. stellata*.

14. **Sphenodesme triflora** Wight, Ic. Pl. Ind. Or. (1850) 14, t. 1478; Miquel, Fl. Ind. Bat. II (1858) 910; Clarke in Hook. f., Fl. Br. Ind. IV (1885) 601; Briq. in Engl. & Prantl, Pflanzenfam. IV 3a (1897) 181; King & Gamble in Journ. As. Soc. Beng. LXXIV, 4 (1909) 861; Lam, Malay. Verb. (1919) 332 & in Bull. Jard. Bot. Buitenz. (1921) 99; Ridl., Fl. Malay Penin. (1923) 638; Fletcher in Kew Bull. (1938) 442; Mold., Résumé Geogr. distr. & Syn. (1959) 166, 178, 181, 188, 192–194 & 345, var. **triflora**. **Plate 16.**

S. triflora Griff. Notul. Pl. As. IV (1854) 182.

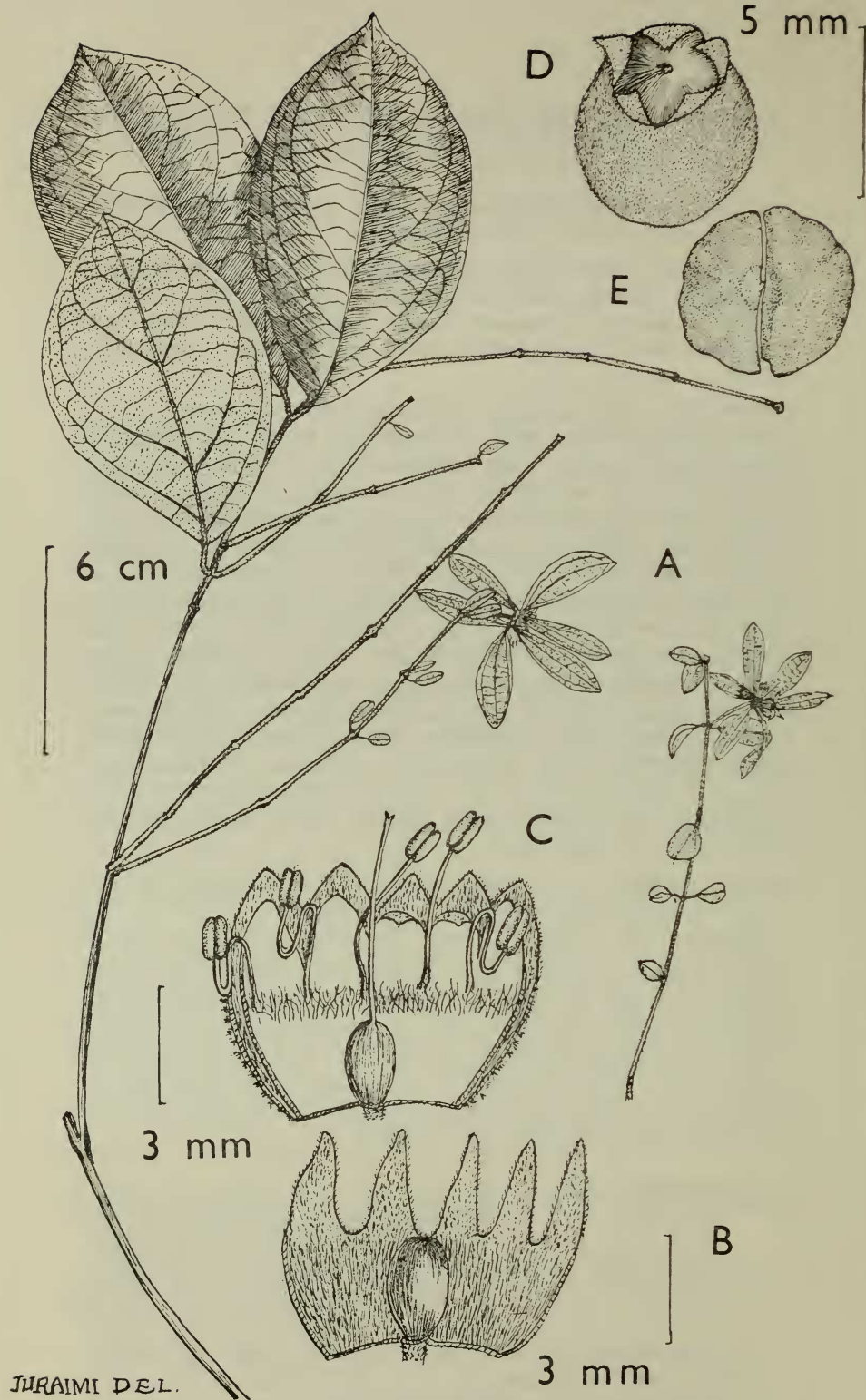


Plate 15. *Sphenodesme stellata* Merrill (Elmer 21,631 in Leiden).

A, Flowering twig. B, Calyx (mature) cut open. C, Flower (in bud) longitudinally cut open. D, Fruit enclosed in accrescent calyx. E, Cotyledons.

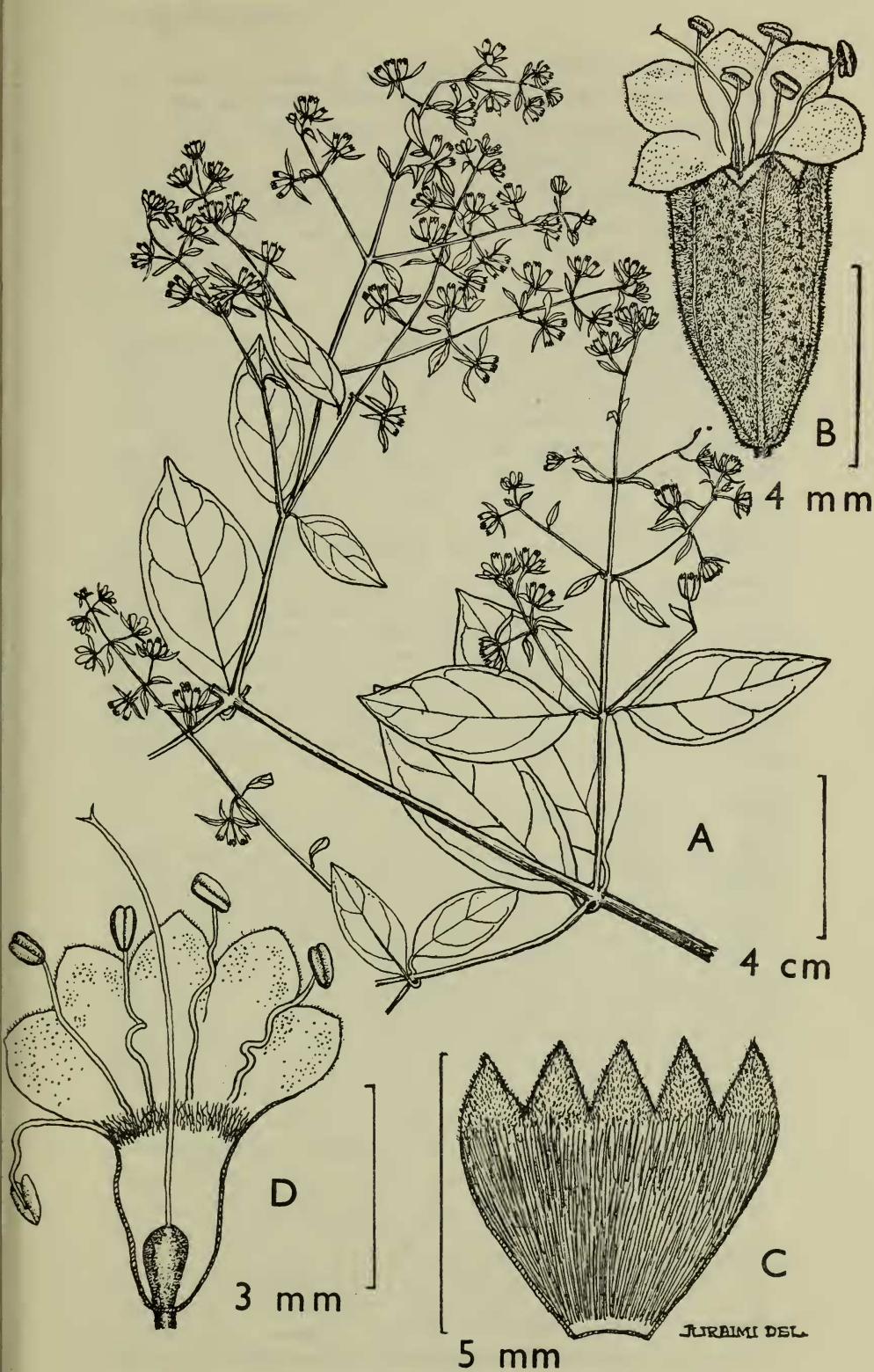


Plate 16. *Sphenodesme triflora* Wight (Griffith, sub Kew No. 6009/1 in Arn. Arboretum).

A, Flowering twig. B, Flower. C, Calyx cut open. D, Corolla cut open longitudinally.

S. clemensorum Mold., Phytologia IV, No. 5 (1953) 368 & Résumé Geogr. distr. & Syn. (1959) 193. **Syn. nov.**

Congea jackiana Wall. Cat. No. 1,735 (1828) p.p. (ex. altera parte = *S. pentandra* Jack).

TYPE SPECIMEN: Malacca, Malaya (Griffith s.n. – K).

This is the only species of the sub-section PENTADONTIA that has its calyx velutinous-pubescent without, corolla-lobes almost glabrous outside, and ovary glabrous. (In var. *triflora*, cymes are always 3-flowered).

Branchlets dark brown, terete, lenticellate, minutely puberulous, later glabrous. *Leaves* chartaceous, lanceolate to oblong-lanceolate, acuminate, obtuse at apex, cuneate towards base, glabrous, 7–13 cm. long, 2.5–5 cm. broad; lateral nerves 4–6 pairs; petioles 5–10 mm. long. *Inflorescence* axillary and terminal, grey-pubescent; panicles spreading, about 50 cm. long; cymes 3-flowered; peduncle upto 1 cm. long; involucre bracts 6, spatulate, puberulous, longer than flowers and enlarged in fruit. *Calyx* 5-lobed, with no accessory teeth, tubular, 4–5 mm. long; lobes acute, almost triangular, pubescent on both sides; tube velutinous to stellate-pubescent without, appressedly hairy within. *Corolla* 5-lobed, dark purple; lobes puberulous, 1–2 mm. long; tube cylindric, 3–6 mm. long, glabrous on both sides except for a narrow villous ring in the throat. *Stamens* 5, exsert; filaments slender; anthers oblong. *Ovary* pyriform, glabrous; style slender; stigma bifid. *Fruit* capsular, ovoid or obovoid, included in the enlarged prominently ribbed calyx.

THAILAND: **Pattani**, Betong, alt. 400 m. (Kerr 7,681: E).

MALAYA: **Penang**, Ayer Itam, alt. 300 m. (Curtis 210: BM & SING); Govt. Hill, alt. 650 m. (Curtis s.n.: SING); loc. incert. (Curtis s.n.: SING). **Perak**, Taiping, Ayer Kuning (Haniff 1,257: BM & SING); Kulim (Haniff 1,264: SING); Gunting Bidai (Ridley 7,598: CAL & SING); loc. incert. (Wray Jr. 1,383; Scortechini s.n.: CAL). **Trengganu**, Kemaman, Bukit Kajang (Corner 30,084: BM & SING). **Pahang**, Kuala Lipis, Jerantut (Smith 93,379: KEP); Raub (Mat Abu 69,628: KEP). **Selangor**, Semangko Pass (Ridley 12,086 & 12,088: SING); Kuala Lumpur (Curtis s.n.: SING); Sungei Buloh (Burkill Jr. 2,546: L & SING; Ridley 13,371: BM & SING; Watson 15,366: SING; Symington 23,056 & 21,064: SING; Jaamat & Osman 18,235: SING; Molesworth-Allen s.n.: SING); Ulu Langat, Bukit Plakayat (Umbai KL. 1,525: A & L); Ulu Gombak (Jaamat & Awang 18,233: SING); Kuala Lumpur, Ampang, (Jaamat 13,809: SING); Kepong, Bukit Beruang (Pawanchee 13,431: SING). **Negri Sembilan**, Seremban, Kirby Estate (R.R.I. No. K16: SING). **Malacca**, [Alor Gajah ?] (Griffith s.n.: K in Herb. Hooker, holotype; BM, DD, E & L, isotypes, & Kew distr. No. 6,009/1: A, BM & C, isotypes); loc. incert. (Maingay 1,196:

L); Sungei Udang (Derry 585: BM & SING); Brisu (Derry 35: BM & SING); Merlimau (Holmberg 817: SING; Ridley s.n.: BM); Ayer Panas (Holmberg 832: SING); loc. incert. (Alvins 1,719: SING); Batang Malaka (Burkill Sr. 1,156: BM & SING). **Johore**, Kluang (Holtum 9,301: A & SING); Gunong Muntahak (Holtum 19,911: SING); Bukit Kayara (Ridley 11,347: SING); Mt. Austin (Ridley s.n.: BM & SING); loc. incert. (Vesterdal 265: C).

BORNEO: **Sabah**, Sandakan (Meijer 38,796: SING); Kebun China (Singh 39,260: SING); Beaufort Hill (Ampuria 40,828: SING); Kabili-Sepilok (Enggoh 7,312: PNH & SING). **Brunei**, Belait, Andulau (Jacob 5,654: L). **Sarawak**, Limbang (Haviland s.n.: SING); Gat, Upper Rejang River (J. & M.S. Clemens 5,651 = Philipp. Bur. Sc. Herb. No. 21,781: A & NY, holotype of *S. clemensorum* Mold.); Batang Lupar, Mt. Sakkarong (Beccari 3,885: L).

SUMATRA: **Indragiri** (Buwalda 7,142: L); Maura Mengkulem (Forbes 3,083: L).

This species was named *Sphenodesma triflora* by Griffith himself, but Griffith's name was published posthumously in 1854, and so Wight's name has precedence, being published in 1850. Griffith states that it was collected at "Verupha" under the vernacular name "Aloor Gajah". But apparently this was an error, for there is a place known as "Alor Gajah" in Malacca, while "Verupha" may be a tamil or Malayalee name for the climbing plant, the first part VERU, VELLU or VELU meaning a creeper, and PHA a flower.

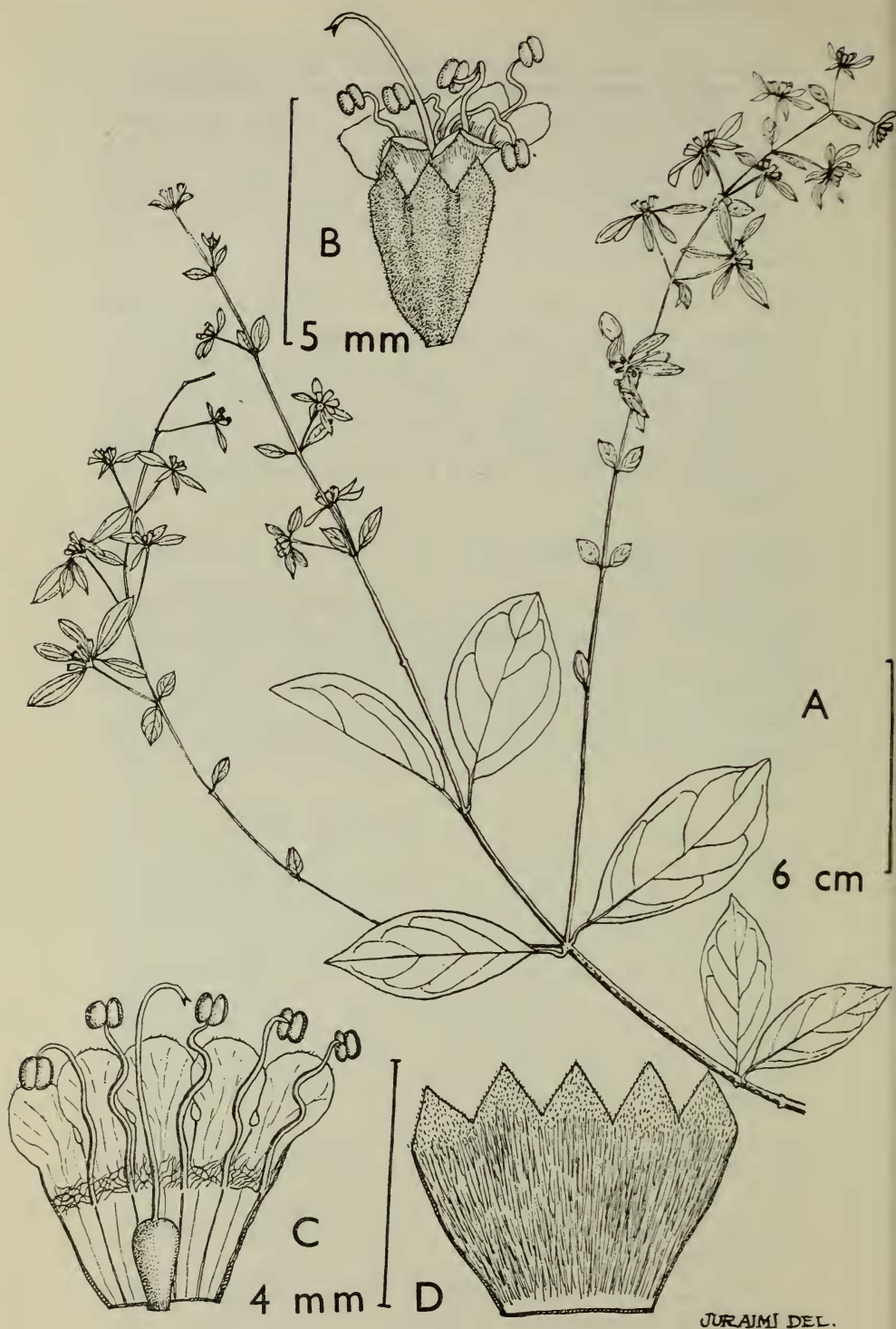
The holotype is apparently not in Calcutta, though the earliest duplicates were distributed from there, for King & Gamble (Mat. Fl. Malay Pen. IV, 1909) do not mention any Griffith's specimen except the one distributed from Kew under No. 6,009/1. Furthermore, the material of this genus on loan from Herb. Bot. Calc. does not represent any sheet of this species collected by Griffith. In view of this I believe the holotype is Griffith's specimen preserved in Herb. Hookerianum in Kew, while the specimens distributed from Kew under No. 6,009/1 appear to be the duplicates of the same, since they were also sent to Kew from Griffith's collection in Calcutta.

14a. *Sphenodesma triflora* Wight var. *riparia* Munir var. nov.
Plate 17.

TYPE SPECIMEN: Brama district. Sarawak (Hose 419 – BM).

A forma typica (var. *triflora*) *cymis quinquefloris, ramulis elenticellatis haec varietas sat distincta.*

This variety is hardly distinguishable from the type form except that it has 5-flowered cymes and elenticellate twigs.



JURAIMI DEL.

Plate 17. *S. triflora* var. *riparia* Munir (Hose 419 in Br. Museum).

A, Fertile twig. B, Flower. C, Corolla cut open. D, Calyx cut open.

MALAYASIA: **Sarawak**, Baram district, on the side of Entoyut river (Charles Hose 419: BM, holotype, & in A, E & PNH); Base of Bt. Lambir, Miri (Othman Haron S.21,392: SING). **Sabah**, Lahad Datu District, Silam (Muin Chai SAN. 25,582: L).

Haron S.21,392, quoted above, differs from the holotype by its leaves being sub-coriaceous and thickly grey-puberulent beneath; bracts and peduncles puberulent and comparatively thicker; branchlets puberulent. What is easily noticed in this specimen is the greyish colour of the leaves below, which is found in none of the other specimens of this or other varieties of this species.

14b. **Sphenodesme triflora** Wight var. **montana** Munir var. **nov.**
Plate 18.

TYPE SPECIMEN: Mt. Kinabalu, Borneo (J. & Clemens s.n. - SING).

A forma typica (var. triflora) ramis cinereo-brunneis, foliis crassioribus subcoriaceis subtus secus nervos puberulis, cymis 7-floris haec varietas differt.

This variety differs from the type form, in its stem being cineraceous-brown, puberulous; leaves thicker, sub-coriaceous, and puberulous on the nerves beneath; cymes 7-flowered.

MALAYSIA: **Sabah**, Mt. Kinabalu (J. & M.S. Clemens s.n.: SING, holotype, & in A, B, L; 26,156: L).

LIST OF TAXA

Sphenodesme

1. *S. ferruginea* (Griff.) Briq.
2. *S. involucrata* (Presl) Robinson
- 2a. *S. involucrata* var. *paniculata* (Clarke) Kunir
3. *S. eryciboides* Kurz
4. *S. griffithiana* Wight
5. *S. mollis* Craib
6. *S. sarawakensis* Moldenke
7. *S. racemosa* (Presl) Moldenke
- 7a. *S. racemosa* var. *sabahensis* Munir
8. *S. mekongensis* Dop
9. *S. pierrei* Dop
10. *S. pentandra* Jack
- 10a. *S. pentandra* var. *wallichiana* (Schauer) Munir
11. *S. thorelii* Dop
12. *S. amethystina* Dop
13. *S. stellata* Merr.
14. *S. triflora* Wight
- 14a. *S. triflora* var. *riparia* Munir
- 14b. *S. triflora* var. *montana* Munir

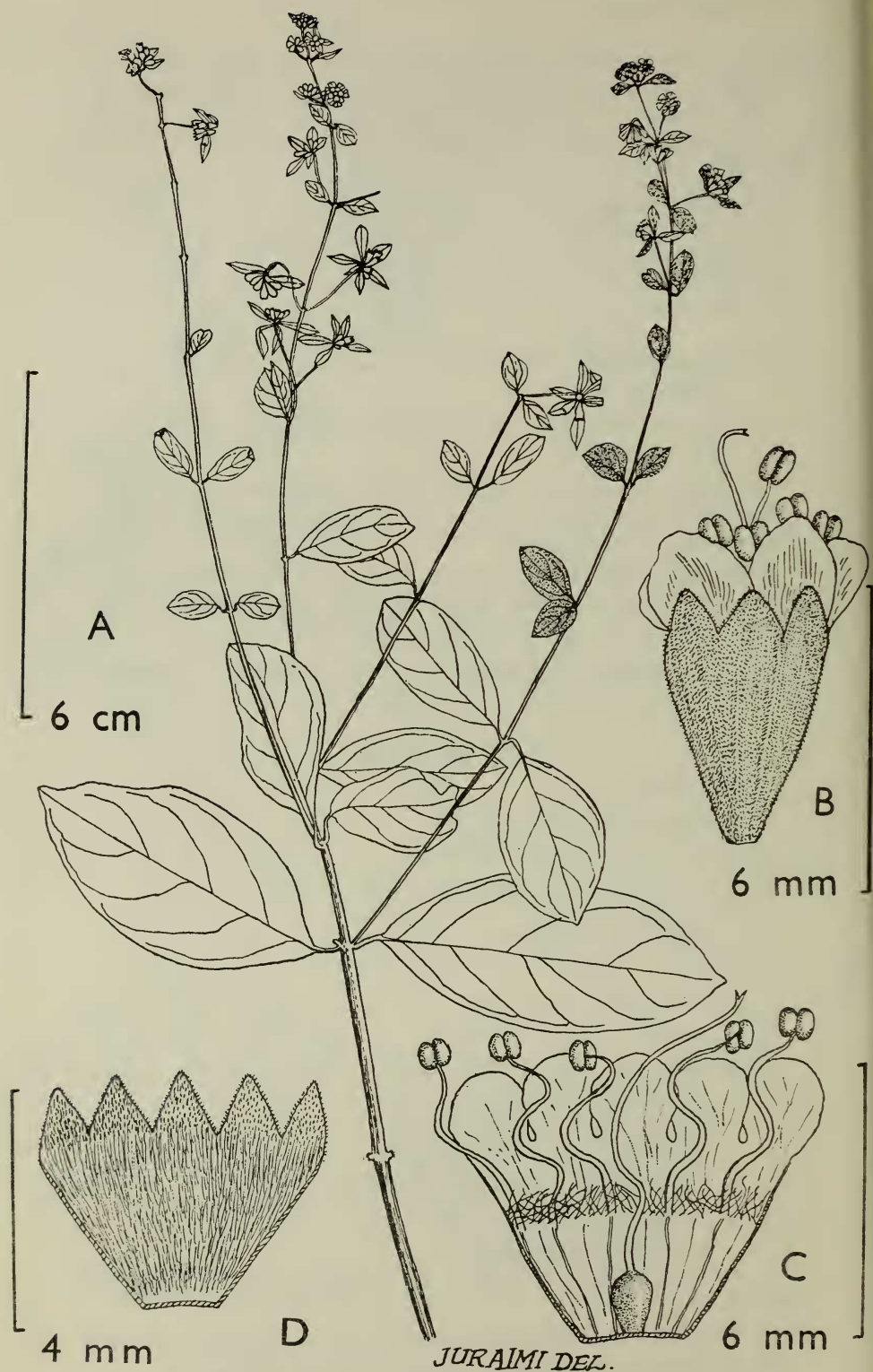


Plate 18. *triflora* var. *montana* Munir (J. & Clemens s.n. in Sing.).

A, Flowering twig. B, Flower. C, Corolla vertically cut open.
D, Calyx longitudinally cut open.

INDEX TO COLLECTORS' NUMBERS

Collectors' names are in alphabetical order and their collections are in numerical order. The number in brackets refers to taxa as follows: —

- ALLEIZETTE 5,722 (10a); s.n. (4); s.n. (10).
ALVINS 957 (7); 1,719 (14); 1,745 & 2,010 (7); 2,138 & 3,304 (10).
AMPURIA 40,828 (14).
ANNANDALE s.n. (10).
BA-PE 803 (1); 10,529 (2).
BECCARI 1,601 (7); 3,885 (14).
BEDDOME 652 (2); s.n. (1).
BOURDILLON 126 (2a).
BRANDIS 879 (3).
BULLOCK 811 & 868 (2).
BUNNEMEIJER 7,634 (7).
BURKILL 531 (1); 1,156 (14); 1,260 (5); 2,546 (14); 3,221 (7).
BURKILL & HANIFF 12,524 (10); 16,922 (7).
BUWALDA 7,142 (14).
CHIN 6,834 (2).
CHUN & Tso 44,281 & 44,669 (2).
CLEMENS 4,143 (2); 5,651 & Philipp. Bur. Sc. Herb. No. 21,781 (14); s.n. (14b).
COLLIN 329 (1); 495, 632, 1,388, 1,416 & 1,969 (10).
CORNER 30,084 (14); s.n. (10).
CUADRA A1,152 (10).
CUBITT 354 (10a).
CURTIS 210 (14); 269, 2,522 & = 2,522 (10); 2,963 (1); s.n. (7); s.n. (10); s.n. (14); s.n. (14).
DE SILVA cf. Wall. Cat. 1,734 (10a); 1,736 (2).
DERRY 35 (14); 40 (10); 179 (7); 585 (14).
DOLMAN 21,493 (10).
ELMER 20,838 (7a); 21,631 (13).
ENGGOH 7,312 (14).
FALCONER 496 (2).
FIELBERG in April 1869 (10).
FORBES 3,083 (14).
FORD 420 (10a).
FORREST 9,837 & 13,617 (10a).
FOX s.n. (10).
FOXWORTHY 450 (7).

- GALLATLY 577 (3).
GARRETT 1,210 (2).
GOWER s.n. (10a).
GRIFFITH 903 (4); K6,007/1 (1); K6,009 (10a); K6,009/1 (14);
s.n. (7); s.n. (10); s.n. (14).

HANIFF 1,257 & 1,264 (14); 15,478 (10).
HANIFF & NUR 2,937 (1); 7,070 (10).
HANSEN 6,629 (2).
HARMOND 520 (10).
HARVEY s.n. (7).
HAVILAND s.n. (7); s.n. (14).
HEINING s.n. (2).
HELPER 42 (2); 43 (4); 54 (2); K6,008 (4); K6,011 (3).
HENRY 13,225 (5); s.n. (2).
HEYNE cf. Wall. Cat. 1,739 (2a).
HOLMBERG 817 (14); 825 (10); 832 (14).
HOLTUM 9,301 (14); 9,410 (7); 19,911 (14).
HOOKER & THOMSON s.n. (2).
HOSE 419 (14a).
HOW 73,729 & 73,733 (2).
HULLETT 520 (10).

JAAMAT 13,809 (14).
JAAMAT & AWANG 18,233 (14).
JAAMAT & OSMAN 18,235 (14).
JACK s.n. (10).
JACOB 5,654 (14).
JOHNSTONE s.n. (2a).

KALONG 20,325 (10).
KAMPHOVENER 2,020 & 2,025 (10a); 3,121 (2).
KAU 273 (2).
KEITH 155 (10).
KERR 1,185 (2); 2,075 (5); 5,849 (10); 6,866 (1); 7,681 (14); 8,376
(1); 8,825 (8); 9,117 & 9,688 (5); 9,812 (2); 9,832 (10); 10,107
(5); 10,305 (1); 10,563 (3); 10,966, 11,035 & 11,063 (5);
11,603, 11,816 & 12,583 (10); 13,436 (5); 13,828, 14,070 &
15,396 (10); 15,633 (1); 16,376 (10); 16,411 & 18,271 (1);
20,030 (2); 20,720 (8).
KING'S COLLECTOR s.n. (2).
KIRAT RAM 3,640 (2).
KOSTERMANS 7,239 (7); 13,542 (10); 78,672 (7).
KUNSTLER 4,532 (10).
KURZ 6,525 & 6,527 (2).

- LACE 2,736 & 2,796 (2); 3,037 (3); 5,165 (10a); 6,072 (2).
LARSEN 8,048, 8,326, 8,462 & 9,051 (5).
LAU 1,213 (10a); 3,113 (2); 3,439 (10a); 5,416 (10a); 28,317 (2).
LEI 439 (10a).
LIANG 61,598 (10a); 64,243 (2); 65,082 (10a).
MACGREGOR 700 & 2,516 (10a).
MAINGAY K1,195 (10); K1,196 (14).
MARCAN 552 (5); 1,204 (10); 1,281 (1); 1,590 & 2,739 (5).
MAT ABU 69,625 (7); 69,628 (14).
MAUNG 12,931 (2).
MCCLURE 8,331 (2).
MCLELLAND s.n.; (2); s.n. (10a).
MEEBOLD 14,054 (2); 14,150 (4); 14,407 (2a).
MEIJER 38,796 (14).
MOKIM 178 (1).
MOLESWORTH-ALLEN s.n.: (14).
MUIN CHAI 25,582 (14a).
MURDOCH 151 (10).
MYA 2,297 (10a).
NATIVE COLLECTOR 1,847 (7); 5,111 & 5,191 (6).
NIELSEN 644 (5).
NUR s.n. (7).
OTHMAN HARON 21,392 (14a).
PACKMAN 67 (4).
PARISH s.n. (1).
PARKINSON 7 (1); 1,940 (4); 11,283 & 16,396 (2).
PAWANCHEE 13,431 (14).
PEREIRA 43,691 (2).
PERROTTET 101 & 160 (2).
PHENGKHLAI 574 (2).
PIERRE 70 (10); 116 (10a); 1,095 (10); s.n. (1); s.n. (9); s.n. (10).
POILANE 1,209 (10a); 3,232 (4); 4,984 (2); 5,342 (5); 5,630 (10);
6,830 & 6,895 (12); 9,637 (5); 13,680 (10a); 16,274 (10); s.n.
(10).
PORTER cf. Wall. Cat. 1,738 (7).
PRAIN s.n. (2).
PROUDLOCK 45 (4).
PUACA 4,749 (13).
PUT 457 & 1,107 (5).

- RABIL 28 (1).
RIDLEY 2,159 (7); 2,160 & 2,793 (10); 7,598 (14); 9,391 & 11,122 (10); 11,347 (14); 12,086, 12,088 & 13,371 (14); 14,187 & 14,937 (10); s.n. (7); s.n. (14).
RIDLEY & CURTIS 8,320 (10).
ROBINSON 1,464 (4).
ROGERS 308 (2).
ROSTADO s.n. (7).
ROXBURGH 1,823 (10a).
R.R.I. KL. 16 (14).
SANGKHACHAND 555 (5); 581 (10).
SCHMIDT 474 & 862 (1); 863 (10).
SCORTECHINI s.n. (14).
SEIDENFADEN 2,129 (10); 2,180 (1); 2,182 & 2,670 (10).
SEIMUND 14 & 275 (10).
SIMON s.n. (2).
SINCLAIR 40,690 (10).
SINGH 39,260 (14).
SMITH 93,379 (14).
SMITINAND 2,200 (10); 2,237 (1); 4,852 (5).
SOW & MOTAN 94,509 (7).
SQUIRES 855 (1).
SUVARNAKOSSES 1,321 (2).
SYMINGTON 21,064 & 23,056 (14).
SYMINGTON & KIAH 28,773 (10a); 28,777 (7).
TALBOT 98 & 136 (1).
TANG 483 (2).
THOREL 649 (10); 653 (1); 1,385 (11); s.n. (8).
TSANG 308 (10a).
UMBAL 1,525 (14).
VAUGHAN 306 (10).
VETERDAL 265 (14).
VOIGT 1,674 2,115 & 2,911 (10a).
WALKER 23,324 (10).
WALLICH Cat. 1,734 (10a); 1,735 & 1,735/1 (10); 1,735/2 (10a); 1,736 & 1,737 (2); 1,738 (7); 1,739 & 1,739/B (2a).
WANG 36,301 (2).
WATSON 15,366 (14).
WATT 6,731 & 11,811 (10a).
WIGHT 910 (2a); s.n. (10a).
WINIT 1,264 & 1,586 (2); 1,961 (8).
WINKLER 2,314 (7).
WRAY 1,383 (14).